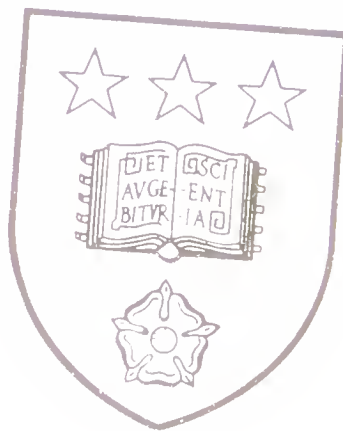


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HEADACHE

AND OTHER

MORBID CEPHALIC SENSATIONS

BY

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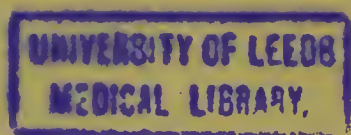
MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS

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PREFACE.

THE advance of clinical medicine in the future will, I believe, be chiefly in the direction of an increased knowledge of the early phases of disease, by means of which we shall be able to detect its approach from its very onset, when, if ever, is the time to stay its progress. Our ability to diagnose such diseases as granular kidney, aortic aneurysm, locomotor ataxy, when the tissues are mutilated beyond recovery, is after all but a poor triumph of medicine, and to pronounce upon a patient sentence of death, or to tell him he has one foot in the grave, is yet sorrier consolation. We want to be able to read the handwriting on the wall while there is yet time to render effective help.

Happily, we have good reason to be sanguine, for not only is all non-traumatic disease in the first instance functional, that is to say, independent of gross organic change : it is also for the most part slow in its oncoming. Health rarely, if ever, passes abruptly into disease : there is not, as it were, a sudden fall into an abyss, but a gradual sliding down an incline.

Such being the case, the study of the more subtle and less

obtrusive manifestations of disease becomes all important, and so deeply have I been impressed with this belief that I have for long past been in the habit of taking abundant notes on these minor manifestations. On one of these—Flushing—I have already published a monograph, and I now give the results of my investigations on another important symptom, founded upon the observation of some 1300 cases.

The appearance of a work on headache may at first sight rouse the fears of those who have a just dread of the modern tendency to specialism, or rather to exclusivism. Let them allay those fears. The physician can never be an exclusivist, for so interdependent are the various parts and functions of the body, that it is impossible to get a philosophic insight into disease in any one part without constantly studying it in all parts. No disorder better shows this than headache, for there is scarcely a disease of which it may not constitute a symptom, and it is this very fact which renders its study so important and so interesting. Thus, headache stands in causal relation to diseases of the eyes, ears, nose, throat, and teeth, and its proper interpretation demands, therefore, a knowledge of all these. It is further intimately related to disorders of the digestive and sexual systems, and to diseases of the kidneys; to morbid states of the blood, such as plethora, anæmia, toxæmia, high arterial tension; and to such maladies as syphilis, gout, and rheumatism. In searching, therefore, for the cause of headache we must be prepared to look for it in every possible direction—to sweep, as it were, the whole horizon, and not confine our attention, as the exclusivist tends to do, to any one spot on it.

In preparing this volume I have endeavoured to acquaint myself with the history of the subject from the earliest days

of medicine, so as to hand on the traditions of the past. This has involved much labour and has led to the accumulation of a large mass of bibliographical detail from which I have endeavoured to select the salient features. I have also freely cited from modern authorities, and although the number of references may at times seem tedious to the reader, they will, I trust, lighten the labour of future workers in the same field.

DEVONSHIRE STREET, W.

November 1893.

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CHAPTER I.

ANATOMICAL.

THE structures involved in headache are those situated above the base of the skull, and there are certain points in their anatomy which must briefly engage our attention. We may conveniently discuss them under three heads:—1. Extra-cranial Structures; 2. Intra-cranial Structures; 3. The Cranium itself.

1. *Extra-cranial Structures*.—These consist of (*a*) muscles; (*b*) aponeuroses; and (*c*) skin.

(*a*) *Muscles*.—Situated at the back of the head is a compact mass of powerful muscles which support and move it, and it is probable that these play an important part in the pathology of some headaches. During the upright position they are never at rest, and they are therefore apt to become fatigued and painful, as, for example, at picture-galleries, where they are kept in constant motion as the head extends and rotates. These muscles spring chiefly from the back part of the cervical spine, and it is not therefore surprising that occipital pain often involves the posterior neck.

Next in importance, from our present point of view, are the massive temporal muscles. They are especially mentioned by Galen, Aurelianus, Willis, and others, as being implicated in the pain of headache. The remaining extra-cranial muscles—the cutaneous—are probably not concerned in headache.

(*b*) *Aponeuroses*.—Three important aponeuroses are contained within the extra-cranial structures—the epicranial, and the two temporal. The former demands our careful attention, on account of the important part which it plays in the phenomena

of headache and other morbid cephalic sensations. This importance was suggested to me on reading Prescott Hewett's very able description of it.¹ It occupies the vertex and is intimately connected with the overlying skin, which is exceptionally dense in texture. On the other hand, the tissue between it and the underlying bone is peculiarly lax, so as to permit the aponeurosis and attached skin to glide freely backwards and forwards over the bone. It consists of closely interwoven white fibres, and is dense in the centre, but gradually loses its tendinous appearance laterally, and finally dwindles into a layer of fibro-cellular tissue.² "A careful dissection of this aponeurosis shows that, throughout its whole extent, it is drilled with holes, for the passage of vessels and nerves. These holes vary very much; . . . in the central parts they are small, mere pin-points, and look like slits between the tendinous fibres; but in the confines of the region they are much larger, and of a roundish shape. The margins of these holes are bounded by tendinous fibres crossing each other. Viewed with a glass, many of these fibres present the well-known appearance of the external abdominal ring, strong pillars forming their sides, with an inter-columnar band running across."³

The epicranial aponeurosis, as already remarked, roughly corresponds to the vertex. Now it is in this situation that tenderness of the scalp—a very common symptom, occurring either with or without headache—most usually and most markedly displays itself. This is also the seat *par excellence* of morbid cephalic sensations, such as those of burning, cold, irritation, pressure.

The tendency for these sensations to be felt in the vertex in women was pointed out more than two centuries ago by one Langius, whose observation has been referred to by many subsequent writers, and it seems probable that their frequent occurrence, together with tenderness, &c., in the region of the crown, is in some way related to the anatomical peculiarity of the epicranial aponeurosis. The sudden alterations in tempera-

¹ See *Medical Times and Gazette*, vol. ii., 1855, p. 79.

² According to Hewett, this layer is continuous with the temporal fascia, but Macalister asserts that the aponeurosis terminates laterally in a free edge

³ Prescott Hewett, *ibid.*

ture to which the scalp is exposed, induce corresponding modifications in the local circulation, and in these the closely adherent epicranial aponeurosis will share. Probably the slightest effusion in this structure is sufficient to cause tenderness, for the nerve-twigs which pass through the apertures in it are then liable to compression, owing to the unyielding nature of the walls of these apertures. And it is not impossible that local circulatory changes short of effusion may help to cause the tenderness, as well as those numerous other morbid sensations which are apt to be felt in this region. It should, however, be mentioned that all these sensations may occur in other parts of the scalp, and that each may occur independently of the others.

The temporal fascia is dense and strong, and covers the temporal muscle on either side. Above, it consists of a single thin layer, which is attached to the superior temporal crest, being continuous with the pericranium (Macalister). Below, it is thicker, and divides into two layers, which are inserted respectively into the outer and inner edges of the upper margin of the zygomatic arch. Between the two layers are some nerve-twigs from the superior maxillary, and a lamina of fat. Like the epicranial aponeurosis, this fascia is penetrated by nerves and blood-vessels, but it has not the same pathological significance, for not only is it fixed, but it is much less intimately connected with the highly vascular scalp.

The pericranium, or external periosteum of the cranial vault, is loosely connected with the bone except at the sutures, where it is firmly adherent. Through these sutures, and through various apertures in the bone, it is continuous with the dura mater. At the margin of the orbit it is continuous with the periosteum of that cavity, which, again, through the sphenoidal fissure, is continuous with the dura. As we should expect, therefore, the pericranium readily shares in diseases of the underlying bone and of the dura, a fact which is well illustrated in the phenomenon known as "Pott's Puffy Tumour," and which enables us to explain the frequent occurrence of local tenderness in intra-cranial disease involving the dura mater.

(c) *Skin*.—That part of the skin of the cranial vault which

is furnished with hair is termed the scalp. This, as we have seen, is in the region of the crown intimately connected with the epicranial aponeurosis. The skin of the scalp is more dense than that of any other part of the body, and, save for the finger-tips, no other part of the skin is so richly vascular, its exceeding vascularity here being provided for the luxuriant growth of hair. The sweat glands of the scalp are scanty, while the sebaceous follicles are numerous and well developed; and it is upon these latter that the healthy state of the scalp and hair largely depends. There can be no doubt that abnormal states of the scalp may share in the causation of headache; thus we sometimes find the excessive formation of dandruff associated with headache; again, undue traction on the hairs, such as occurs in certain modes of wearing the hair, may help to cause pain in the head; and this it doubtless does by producing some dynamic change—vascular, nervous, or other—in the scalp.

Nerve Supply of Extra-cranial Structures.—The whole of the head anterior to a vertical section through the two external auditory meati, is supplied by the fifth nerve. The supra-orbital nerve supplies a large part of the forehead and the anterior portion of the vertex, and the supra-trochlear is distributed over a small area above the inner aspect of the eye. The temporo-malar region receives branches from the first and second divisions of the fifth. The auriculo-temporal, from the third division of the fifth, passes up between the condyle of the lower jaw and the external auditory meatus, supplying the anterior aspect of the pinna (except in its inferior part) and a portion of the temporal and parietal region. The posterior aspect of the head is supplied by the posterior divisions of the first and second cervical nerves (the latter being the great occipital), and by the small occipital, great auricular, and Arnold's nerve. The great occipital sends branches to a large part of the occiput and the posterior portion of the vertex; the small occipital supplies the more lateral aspect of the occiput, and the inferior and posterior aspect of the pinna. The great auricular supplies the mastoid and adjacent regions, the lower two-thirds of the posterior aspect of the pinna, and the posterior with (according to Hilton) the anterior aspect of the lobule.

Arnold's nerve from the vagus issues from the auricular fissure and sends small branches to contiguous parts.

Practically all of these nerves send branches inwards to the pericranium, and in their passage they frequently, as already observed, pierce dense aponeuroses, and are thus liable to compression.

I may here remark that I have observed neuralgias which were limited, more or less definitely, to the areas severally supplied by the supra-orbital, supra-frontal, auriculo-temporal, great auricular, and great occipital nerves.

Vascular Supply of Extra-cranial Structures.—We have seen that the scalp is a highly vascular structure. Some of the vessels, *e.g.*, the supra-orbital and the supra-trochlear, are deep-seated; others, *e.g.*, the temporal and occipital, are superficial. Branches from these superficial vessels penetrate the aponeuroses in the way above described, and supply the subjacent structures. Those distributed to the pericranium are, in the adult, almost capillary; but, during the rapid cranial growth of early years, they are much larger. Of the extra-cranial arteries, the temporals are clinically the most important, since they are not only very superficial, but run for some part of their course under hairless skin, thus lending themselves to observation. During an attack of megrim one of the temporals may become unusually hard and prominent, and in persons liable to pain in one temple, whether megrinous or otherwise, the artery on the affected side will generally be found to be larger and more tortuous than its fellow. The temporals afford a useful index of general arterial tension. If a man of twenty-five years of age has both temporals very tortuous and prominent, we may almost certainly conclude that his arterial tension is habitually high. Such a one will probably be liable to headaches, very likely to megrim. If, however, the temporals are not prominent, we cannot assume the contrary, for in some they are more deeply seated or more enveloped in fat than in others. They are much less prominent in the woman than in the man, partly, I believe, for the reason just given, and partly because arterial tension is decidedly lower in the one than in the other.

Extra-cranial Lymphatic System.—The lymphatics of the

hindmost part of the scalp are received by one or two lymphatic glands situated superficially in the sub-occipital region. Two or three glands situated over the insertion of the sterno-mastoid muscle receive lymphatics which descend behind the ear from the lateral aspect of the scalp. The above glands are often enlarged when the head is infested with pediculi—a potent cause of headache among the poor. The lymphatics from the temporal region pass into three or four glands situated under the parotid fascia, those from the anterior aspect of the scalp passing into the lymphatics of the face.

2. *Intra-cranial Structures*.—The dura mater consists of two layers separated at intervals so as to form the sinuses. The outer layer is closely adherent to the bone, and is intimately connected with the pericranium through the sutures and apertures in the bone. Hence disease in the one is very apt to implicate the other; probably also, this anatomical connection partly accounts for the facts that disease of the dura is often attended by tenderness or pain on percussing the overlying skull, and that pain due to such disease may be relieved by external applications.

The dura is also continuous with the pericranium, inasmuch as it passes into the periosteum of the orbit through the sphenoidal fissure. It moreover sends sheaths to the various cranial nerves, that to the optic nerve expanding into the sclerotic of the eye. This latter connection was especially insisted on by Galen, who, not unnaturally, argued that when headache was attended with pain in the eyeballs, the cause was intra-cranial, the disorder travelling along “the roots of the eyes,” owing to the anatomical continuity in question. Finally, the dura sends inward three great processes: the falx cerebri, the falx cerebelli, and the tentorium cerebelli—structures which are very apt to be implicated in organic disease of the brain, whether by direct involvement or by being stretched, as in tumour of the brain. Notably is the tentorium cerebelli often involved in both of these ways by tumour of the cerebellum, pain in the occiput and nucha resulting.

Nerves from the fifth, the twelfth, and the sympathetic can be traced into the dura.

The pia mater is closely fitted to the surface of the brain,

but at the great transverse fissures it passes into its interior, forming the velum interpositum and choroid plexuses, and thus it may be involved in organic disease confined to the interior of the brain.

The pia is said by Kölliker and others to be supplied with nerve fibres from the third, fifth, facial, pneumogastric, glosso-pharyngeal, spinal-accessory, and sympathetic; but it is thought that most of the fibres are distributed to the blood-vessels.

The arachnoid divides the space between the dura and pia into the sub-dural and sub-arachnoidal spaces, the latter being intersected by numerous trabeculæ, and communicating with the great cerebro-spinal cavity through an opening in the roof of the fourth ventricle. Luschka and others have traced fibres from the fifth, facial, and accessory nerves into the arachnoid of ruminants.

It is unnecessary to enter into the anatomy of the *brain* further than to say that the only special nerves traceable to it are derived from the sympathetic.

3. *The Cranium*.—Some of the bones forming the great cranial cavity contain subsidiary cavities—*e.g.*, the frontal, ethmoidal, and sphenoidal sinuses, and the middle ear. All these, which are lined with mucous membrane and are abundantly supplied with blood-vessels and nerves, may stand in causal relation to headache. The anatomy of these structures will be referred to in another place.

CHAPTER II.

THE SEAT OF THE PAIN IN HEADACHE.

BEFORE discussing what constitutes the seat of the pain in headache, it will be well to define exactly what we mean when we say any part is the seat of pain. We now know that, as a matter of fact, all sensations arise in connection with the brain, and are only "referred" to various parts of the body. When, therefore, we speak of a part being the seat of pain, we mean that the pain which arises correlatively with certain cerebral processes, appears to the ego to proceed from that part. This is the *mental* criterion of what constitutes the seat of pain. It will be seen that the aching part is not, in the strict sense of the term, painful (*i.e.*, full of pain), the pain, so far as it is possible to speak of it as having any position in space, being more accurately placed in the brain. Seeing, however, that mental phenomena have no relation whatever to space, we cannot rightly speak of a sensation occupying any part of space. To the ancients no such difficulties presented themselves, for mind to them was an attenuated form of matter; when they spoke of a part being painful, they regarded it as pervaded by a sentient substance, and we moderns, though with clearer views, find ourselves still using the nomenclature which under the seal of their authority has become familiar to the popular mind.

But the mental criterion by which, as I have said, we determine the seat of a pain is by no means adequate in all cases, and in no case less so than in headache. Defining this latter as pain felt anywhere above the base of the skull, it is obvious that it may be seated (I use the expression in the sense in-

licated above) in many different structures. The aching structure may be the brain itself; its membranes—the pia, arachnoid, and dura, these including the tentorium cerebelli, the falx cerebri and cerebelli, and the large fold of pia forming the velum interpositum; the skull bones, the mucous membrane lining the frontal, ethmoid, sphenoid, and mastoid sinuses, and the middle ear; and, finally, the structures covering the cranial vault, including the scalp, the skin of the forehead and temples, and all the tissues lying between these and the bone—viz., the pericranium, certain aponeuroses, and muscles. Now, it is very seldom that a person suffering from headache can definitely refer the pain to any one of these, and therefore the mental criterion is practically useless in determining its seat. Wherefore we have to fall back upon another test, which we may term the *physiological*. When any part of the body capable—in the popular sense—of feeling pain is so irritated that pain is set up, certain nervous arrangements in the cortex are agitated, and the concomitant pain is referred, with more or less definiteness, to the part irritated. All the structures above the base of the skull, irritation of which induces pain, have such nervous arrangements—or, to use a more convenient term, “algenic centres”—allotted to them, and when without any peripheral irritation the algenic centres of any portion of these structures are being agitated, that portion constitutes the seat of the pain. It is clear that headache may result from irritation of the aching part (as may happen in the pain of megrim, which some attribute to colic of the temporal or other artery) or that it may arise independently of such irritation. In the former case what we mean by the “seat of the pain” is at once manifest, but in the latter our notions on the subject would be obscure did we not apply our physiological criterion. Suppose, for instance, that the pia mater is free from irritation of any sort, but that the algenic centres belonging to it are being agitated. The pain not being definitely referred by the patient to the pia, it would be impossible, without this our second criterion, to speak of it as having any seat at all.

It is thought by some that the brain is itself incapable of feeling pain—that no kind of irritation of its own substance will provoke pain in it; and if such is the case, then we must

suppose that the brain has no special sensorial system, no sensory nerves distributed throughout its substance and connected with special centres in the cortex. At first sight it seems strange that this organ, consisting, as it does, of the largest and most complex mass of nervous matter in the body, should not be exquisitely sensitive. On a little reflection, however, it will be seen that a part is sensitive only by virtue of special sensory end-organs distributed throughout its substance—these end-organs having corresponding cortical centres—and that in the absence of these it must be insensitive. If a sensory *fibre* is stimulated in its continuity, the resulting sensation (if indeed any sensation result) is referred, not to the part of the fibre irritated, but to its peripheral distribution; whereas, if a *nerve* containing sensory fibres—say the ulnar—is stimulated, the sensation is felt both at the spot stimulated, and at the peripheral distribution of the fibres. The former sensation is due to the irritation of special sensory end-organs (belonging to the *nervi-nervorum*) distributed to the nerve trunk, and on which the pain of neuralgia depends; the latter, to the irritation of the sensory fibres of the ulnar in their course. A sensory fibre is far less responsive to irritation in its continuity than in its end-organ; the optic nerve, *e.g.*, is far less sensitive to stimuli than the retina. Were this otherwise, the result would be disastrous; the slightest irritation in the posterior portion of the hind limb of the internal capsule, for instance, would give rise to sensations all over one side of the body, and to the various special sensations of sight, hearing, taste, and smell on the corresponding side.

Historical.—I have elsewhere entered at considerable length into the history of this subject,¹ and it will therefore be sufficient if I here epitomise what I have said there. It is remarkable that the views of the ancients respecting the structures involved in the pain of headache were very much the same as those of to-day. They for the most part excluded the brain, and fixed on the extra-cerebral structures, such as the meninges, pericranium, and scalp, as the seats of the pain. This view has been maintained by all writers of importance, with one or two exceptions, down to the present time.

¹ *Lancet*, 1893, vol. ii., p. 184. See note at end of chapter.

Galen looked upon the meninges and the pericranium as the chief seats of headache, but he did not entirely exclude the brain, seeing that he regarded the arteries and veins as capable of sensibility.¹ He thought the temporal muscle might be the seat of the pain in hemicrania. He further distinguished between internal and external headache; between pain situated in intra-cranial, and pain situated in extra-cranial structures; and he even claimed to diagnose one from the other. In the former, the pain was supposed to extend to "the roots of the eyes," owing to the continuity of the dura with the optic sheaths; while tenderness of the external parts was supposed to indicate the latter. The above diagnostic sign of "internal headache" is mentioned by Paulus Ægineta, Ætius, and Avicenna, and is referred to in almost Galen's own words by many writers of the seventeenth and eighteenth centuries. Fernelius was one of the first to reject it, arguing that pericranial pain also might spread to the "roots of the eyes," owing to the continuity of this structure with the lining membrane of the orbit. Rondeletius did not regard this objection as valid, and argued that pericranial pain generally arises from cold, which cannot reach the orbit, because the latter is protected "by the warmth of the eyes, by the spirits and the blood."² Other authors similarly exercised themselves on this question. Galen's view was founded on clinical observation, and his reasoning is perfectly intelligible. As a matter of fact, the eyes are apt to be involved in pain in all cases of frontal headache, and although it is impossible to exclude the meninges, there can be little doubt that the pain is generally located in the more superficial structures. The forehead and the eyes receive their sensory nerves from the first division of the fifth nerve, and it is therefore no wonder that the two are often involved in pain together; but seeing that the extra-cranial part of the frontal regions has far more numerous branches from it than the intra-cranial structures, we should expect the former to be chiefly involved in the pain of frontal headache.

C. Aurelianus, who probably lived shortly after Galen,

¹ See Theophili Boneti, "Sepulchretum," Lugduni, 1700, tom. i., p. 35.

² *Ibid*, pp. 19, 20.

writes: "Some have said that the membrane (of the brain) suffers in headache; others, that which surrounds the skull; others, the whole skin of the head; others, the temporal and buccal muscles."¹ No mention, it will be observed, is here made of the brain as a possible seat of the pain, and Aurelianus does not commit himself to an opinion on the point.

The Arabian writers do not appear to have added anything to the views of Galen on the subject, nor when we come to the seventeenth century do we find much that is new. According to Fernelius, the meninges and the pericranium are the only structures capable of feeling exquisite pain in headache.² Willis gave as the parts affected in headache, the meninges and their processes, the nerve-sheaths, the pericranium, and other aponeurotic structures, the fleshy part of the muscles, and lastly, the skin itself; while he exempted the brain, medulla, and skull from sensibility.³ He distinguishes between internal and external headache, and gives means of diagnosing the two.

Bartholinus quotes G. Hannaeus to the effect that certain muscles might constitute the seat of pain in headache.⁴

The early pathologists were not content merely to differentiate between internal and external headache: they sought to discover the particular structure involved in the pain, in which attempt they were guided by definite rules.⁵ Nay, more than this, they even tried to diagnose the exact nature of the morbid process in each case—as, for instance, what particular humour was at fault—being in this largely influenced by the highly speculative mind of Galen, who gave a bias to medical thought to within comparatively recent times.

Coming to the eighteenth century, we find Van Swieten placing the pain of headache in the "calvarium and its integuments." Hoffmann affirms the pia, the arachnoid, and the brain to be exempt from sensibility, remarking that the former two

¹ "De Capitis Passione quam Graeci Cephalaeam nominant."

² "De Morbis Universalibus," Lugd. Bat., 1645, p. 91.

³ See English translations of his works by "S. P.," Lond. 1864, "Of the Soul of Brutes," pp. 105, 106.

⁴ T. Bartholini, "Acta Medica," Hafniæ, 1677, vol. iii., p. 108.

⁵ See "Observationes de Affect. Capitis," B. et G. M. Wepfer. Scaph, 1727, p. 76.

are devoid of nerves and "elastic fibres," while the latter may be severely injured without pain being felt.¹

Whytt confutes the view, held for some time, that the dura mater is capable of "oscillation," and he contends that the cerebral membranes are endowed with only a very obtuse kind of feeling, referring to Haller's experiments in favour of this notion.²

Fordyce apparently suggests that the pain of hemicrania may be in the falx cerebri and temporal muscles.³

Heberden seems to ignore what others had said on the subject, merely remarking that headaches "appear to be seated in the brain itself."⁴

Many eighteenth-century writers place the seat of the pain in frontal headache in the membrane lining the frontal sinuses.

This rapid survey brings us down to our own age, in which we find the views regarding the seat of headache remaining substantially the same as those held during the previous centuries. The tendency to locate the pain within the brain is as small as ever, though some few authors yield to it. Thus Romberg terms megrim "neuralgia cerebialis," and Bennett,⁵ apparently influenced by Sauvages, contends that all headaches, except "the organic and neuralgic," depend upon cerebral congestion. Wilks, while pointing out that the pain of headache often seems to proceed from the very depths of the brain itself, is doubtful whether such is actually the case.⁶ Seller places the pain, in those cases where there is no manifest disease of the extra-cerebral structures, in the nerves accompanying the cerebral blood-vessels;⁷ and Symonds holds substantially the same view.⁸

We have seen that some early authors were careful to reckon

¹ "A System of the Practice of Medicine," F. Hoffmann, Eng. trans. by W. Lewis, Lond. 1783, vol. i., pp. 459-477.

² "Observations," etc., Rob. Whytt, Edin. 1765, p. 41.

³ "Historia Febris Miliaris et de Hemicrania," Lond. 1758, p. 86.

⁴ "Commentaries," etc., W. Heberden, 3rd edit., Lond. 1806, p. 92.

⁵ "Library of Med.," vol. ii., p. 155.

⁶ "On Diseases of the Nervous System," 2nd edit., p. 552.

⁷ *Monthly Journal of Medical Sciences*, Sept. 1848, p. 137.

⁸ Gulstonian Lectures, 1858, *Med. Times and Gazette*, vol. i., pp. 285-6.

certain extra-cranial muscles among the structures involved in the pain of headache. Such are Galen, C. Aurelianus, and in later days, Willis, Montalto, Bartholinus, Whytt, and Fordyce. Briguët and Léon Colin have, in recent times, done the same, apparently without any knowledge that it was the belief held long ago. Colin regards the pain of headache as almost entirely extra-cranial; he argues that the aponeurosis of the occipito-frontalis is peculiarly liable to painful affections, owing to its structure, to its position, and to the constant changes in temperature to which it is subjected; and he asserts that its anatomical character, notably its inextensibility, renders its nerves very liable to be compressed during the hyperæmia which he supposes to result from exposure and other causes. But his article is chiefly remarkable for the importance which it shows he attaches to the cranial muscles as being a seat and source of the pain in headache. "Of all the muscles in the body," he writes, "those which are inserted into the head are precisely those whose action is most frequent and most continuous—the only ones which, during sedentary occupations, do not rest. They play a considerable part in the causation of headache."¹ Thus, not only are they liable to the pain of fatigue, but they are apt to set up headache from their close connection with the aponeurosis of the occipito-frontalis. More recently, Norstroëm has expressed the opinion that certain cases of headache are due to inflammatory thickening—the result of catching cold—at the insertion of particular muscles, no pain being usually felt at the indurated spots.²

There is a general consensus of opinion that the pain of megrim is wholly extra-cerebral, and chiefly extra-cranial. Pinel regarded megrim as a facial neuralgia, and Chaussier localised it in the supra-orbital nerves.³ Laycock considered it as "rather a neuralgia of the cranium, dura mater, or the scalp, than of the encephalon."⁴ Anstie looked upon it as neuralgia of the fifth, but did not regard the meninges as exempt from suffering, the pain in some headaches being deep-seated.⁵

¹ "Dict. Encyclop. des Sciences Méd.," art. Céphalalgie, Paris, 1873.

² *Lancet*, 1890, vol. ii., p. 683.

³ Labarraque, "Essai sur la Céphalalgie," Paris, p. 37.

⁴ *Medical Times and Gazette*, 1865, vol. i., p. 488.

⁵ "Neuralgia and its Counterfeits," Lond. 1871, p. 85.

Nothnagel, Lauder Brunton, and others have localised it in the extra-cerebral arteries, attributing it to arterial colic. The last-named physician believes that it is due to the temporal or some other artery being constricted peripherally, and dilated on the proximal side of the constriction, the result being that the blood is driven with great impact against the constricted part, thus causing the pain.¹

It is interesting to note that Whytt had long ago connected headache with vasomotor spasm, for he says that in consequence of gastric disturbance "the nerves, chiefly of the fore part of the head, suffer; and the small vessels to which they are distributed are either affected with a continuous spasm, or agitated with uncommon alternate contractions and relaxations," pain resulting.²

In regard to the blood-vessels being a possible seat of the pain in headache, it is noteworthy that so long ago as the time of Galen they were regarded as sensitive; and it may also be observed that hemiplegia due to syphilitic thrombosis is frequently preceded by headache. Gowers remarks that the pain in these instances is "apparently in some way due to the arterial disease itself."³

We thus see that the question—In what structures is the pain of headache seated?—has occupied the physician's mind from ancient times, and it is curious that we to-day are very little nearer the answer than was Galen of old. I shall now briefly express my own views.

First, as regards functional headache. I think it highly probable that the brain is not involved in this pain. It is improbable that a tissue, absolutely insensitive to traumatic injuries, should become painful under mere functional disturbance. It is true that tissues known to be insensitive when in the healthy state, may become acutely painful when affected by active organic disease, but there is a wide difference between such disease and mere functional disturbance. It is, however, conceivable that colic of a cerebral vessel may cause pain, but this is mere conjecture.

¹ "Disorders of Digestion," London, 1886, p. 103.

² "Observations," etc., Edin. 1765, pp. 305, 306.

³ *Lancet*, Feb. 2, 1889, p. 208.

Even granting, however, that the brain may ache in functional headache, it is absolutely certain that the ache is not confined to this organ. Some of the extra-cerebral structures are beyond all doubt involved. In the first place, the pain can not infrequently be felt to be superficial; and although, as I have said, the mental criterion is not always a safe one, yet some reliance may be placed upon it. A second argument lies in the fact that the pain may spread beyond the region of the brain-case. Thus, in cervico-occipital headache it may extend to the back of the neck and trunk, and in frontal headache to the eyes, the root of the nose, or indeed to any part of the face. Then again in headache due to retinal irritation, the pain in most cases involves the frontal region, and not the occipital, as, on the theory that the brain itself aches, one would rather expect, seeing that the optic centres are situated in the hinder part of the brain.¹ Finally, the pain may be limited to definite nerve-areas.

Whether all the extra-cerebral structures may be involved in functional headache, it is difficult to say. My own impression is that the structures chiefly implicated are the extra-cranial, the intra-osseous, and the dura mater, while the pia, arachnoid, and bone escape. By the intra-osseous structures I mean the frontal and other sinuses (which are lined with mucous membrane) and the middle and internal ear.

These several structures are all richly supplied with nerves, and hence are capable of acute sensation. The dura is certainly exquisitely sensitive to pain, as has been attested by experiment. The pia and arachnoid are apparently insensitive when in the healthy state, and are scarcely likely to become painful from simple functional disturbances; nor is the bone, although this doubtless has a certain amount of sensibility.

The fact that the pain of functional headache sometimes appears to be deep-seated can be explained without assuming that the brain itself is sensitive, for folds of the sensitive dura insinuate themselves into the inmost recesses of the organ.

Next, as regards organic headache. All the structures already mentioned as involved in functional headache may of

¹ I am not at all sure that this is a sound argument, but I advance it because it is perhaps worthy of some attention.

course be implicated in organic headache, either by being actually affected by the organic disease, or by sympathy, for such disease may set up functional headache; and in addition to these, the bone, when the seat of organic disease, may be painful, as, for instance, in syphilis. The question we have to decide is whether the brain itself, and the pia and arachnoid, are involved in the pain of intra-cranial organic disease. Ferrier, while holding that the brain is under all circumstances insensitive,¹ thinks that the latter membranes, though little if at all sensitive in the healthy state, may become so when invaded by structural disease; for, he argues, they have sympathetic nerves, which, like other sympathetic nerves, may conduct impulses issuing in painful states.

In reference to this argument, however, it must be remembered that the brain also contains sympathetic fibres. Ferrier further supports his view by instancing the fact that an inflamed artery is acutely painful when ligatured; but this argument also applies to the arteries of the brain. My own impression is that both these membranes and the brain itself may become painful in intra-cranial organic disease, and that while intra-cranial tumour causes pain chiefly through the dura, pia, and arachnoid, either by directly implicating or stretching them, in certain other affections of the brain, such as inflammation and arterial disease, the brain itself may be painful, though whether the pain then affects the brain substance proper, or is confined to its arteries, I do not attempt to decide.

NOTE.—The paper referred to in the footnote of p. 12 was, owing to temporary illness, published without my revision, the corrected proofs arriving after the journal had gone to press. In consequence of this the paper contains some rather unfortunate mistakes. The three most important are: In the tenth line of the first paragraph “appears to the eye” should be “appears to the mind”; in the thirty-second line from the bottom of the first column of page 185 “the notions” should be “our notions”; the quotation from Bonetus in the second column of page 185 ends at the words “devoid of sensibility,” and not, as it appears to do, eleven lines higher.

¹ “Pain in the Head in connection with Cerebral Disease,” *Brain*, vol. i., p. 467.

PART II.

CAUSATION.

CHAPTER I.

CAUSATION OF HEADACHE—GENERAL REMARKS.

THE human mind delights in classifying, labelling, pigeon-holing. Nor is this surprising, for the instinct to classify, to arrange facts according to their resemblances, is a fundamental attribute of mind, an attribute which lies at the very root of knowledge. But while there is nothing more admirable (intellectually speaking) than a good classification, there is, on the other hand, nothing more execrable than a bad one, which, instead of making "Cosmos out of Chaos," makes confusion worse confounded. Let us therefore beware how we classify—that we group our facts according to real, not fancied resemblances. The cut-and-dried, arbitrary, and final way in which headaches are classified by different writers on the subject, shows to what base use the classifying instinct may be put. Each one I have consulted makes a classification more or less elaborate according to his ability and ingenuity; the symptoms of each variety are catalogued with great nicety, and from them the reader is supposed to be able to diagnose the particular case in point, and to prescribe its appropriate treatment. Now, as that philosophic, truth-loving physician, Moxon, caustically remarks, "To be able to conceive," much less to "actively adopt such a division of headaches is a mark of a very clever man;" and, continuing in the same vein of sarcasm, he writes: "You will find some very certain and simple charm-cures for some very complicated headaches. And if you master the difficulty that the absolute certainty of the cure is precisely balanced by the absolute impossibility of being sure you are dealing with the

right case, with such elaborate vagueness is it characterised, it appears you may have surprising success with a few minims of this, that, or the other.”¹

The following classification of headaches, taken from a recent writer, may be cited as an instance in point :²

- | | |
|-------------------------|--------------------------|
| 1. Hyperæmic headaches. | 6. Hysterical headaches. |
| 2. Anæmic “ | 7. Sympathetic “ |
| 3. Rheumatic “ | 8. Toxic “ |
| 4. Syphilitic “ | 9. Nervous. “ |
| 5. Neuræsthenic “ | |

Such a classification (and it is a fair sample of others³) offends alike against logic and clinical experience. It is simply chaotic.

¹ *The Lancet*, 1875, vol. i., p. 750.

² “Allgemeine Encyklopädie der Wissenschaften und Künste,” Leipzig, 1885, Article “Kopfschmerz,” Sect. ii., Part 38, p. 368.

³ Sauvages made 13 species of Cephalalgia, 7 of Cephadea, and 10 of Hemis-
crania—that is to say, 30 in all ; and to these his editor Daniel added 13.

Copland makes 11 varieties :

- | | |
|---|-----------------------------|
| 1. Nervous. | 6. Pericranial. |
| 2. Congestive. | 7. Hemicranial. |
| 3. Plethoric and inflammatory. | 8. Rheumatic and arthritic. |
| 4. Dyspeptic and bilious. | 9. Periodic. |
| 5. Cerebral (organic intra-cranial
disease). | 10. Hypochondriacal. |
| | 11. Sympathetic. |

Bennett gives 7 :

- | | |
|------------------|------------------|
| 1. Congestive. | 5. Neuralgic. |
| 2. Inflammatory. | 6. Metastatic. |
| 3. Sympathetic. | 7. Intermittent. |
| 4. Organic. | |

Day classifies thus :

- | | |
|---|--|
| 1. The headaches of cerebral anæmia. | 7. Neuro-hyperæmic headache. |
| 2. The headaches of cerebral hyper-
æmia. | 8. Toxæmic headache. |
| 3. Sympathetic headache. | 9. Arthritic or gouty headache. |
| 4. Congestive headache. | 10. Syphilitic headache. |
| 5. Headache from plethora and in-
creased vascular action. | 11. Organic or structural headache. |
| 6. Neuralgic headache. | 12. Headaches of advanced age. |
| | 13. Headaches of childhood and
early age. |

One method of classifying headaches is according to the different ways in which they manifest themselves—according to their symptomatology—but this is not practicable. Headache is itself a symptom, and if we are anxious to classify the different forms it takes, our classification, to be sound, must be founded upon *causation*. I do not say that the symptomatology of headache is to be entirely neglected, for in certain cases it does help us in diagnosis and treatment. In megrim, for instance, it suggests an excess of uric acid in the blood, and the consequent need to restrict nitrogenous diet; but uric-acidæmia may give rise to headache which is not of the classic megrinous type; whence it is clear that symptoms alone are not a safe index, and that it is to

The following classification is Weatherhead's:

1. Dyspeptic or sick headache.
2. Nervous headache.
3. Headache from fulness of blood in the head, arising from (a) venous, (b) arterial plethora.
4. Rheumatic headache.
5. Arthritic headache.
6. Headache from organic disease of the brain.

Cotin classifies as follows:

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Congestive. <ul style="list-style-type: none"> (a) plethora. (b) passive } hyperæmia. (c) active } 2. Sympathetic. <ul style="list-style-type: none"> (a) digestive. (b) uterine. | <ol style="list-style-type: none"> 3. Diathetic. <ul style="list-style-type: none"> (a) rheumatic. (b) gouty. (c) scorbutic. (d) syphilitic. (e) anæmic. |
|--|---|

The following is Wright's classification, which he still further elaborates:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. The plethoric { (a) temporary. { (b) occasional. 2. The congestive headache. | <ol style="list-style-type: none"> 3. Digestive headache. 4. The sick headache. 5. Nervous headache. |
|---|---|

Symonds classifies headache as:

1. The structural.
2. The hyperæmic.
3. The nervous or neuralgic (including an "idiopathic" and a "sympathetic" form).
4. The toxæmic.

The old writers divided headaches into the idiopathic or essential—those, namely, due to disease in the head itself; and the symptomatic, or those depending upon disease in some other part of the body.

causes rather than to them that the physician must look as the essential guides. So far, indeed, as treatment is concerned, this fact has been recognised from ancient time, Galen expressly pointing out that inasmuch as "headaches do not all arise from one and the same cause, the treatment of them must be diverse."¹

I shall therefore devote Part II. of this work to a consideration of the manifold causes of headache. Galen enumerates among them gastric disturbance, fever, head-injury, excessive wine-drinking, exertion, menstrual suppression, uterine irritation, sunstroke, excessive cold; while Willis was so impressed with their multiplicity that he declares it "is almost impossible to recount them."² The most exhaustive list I have met with is given by Ploucquet in his *Medical Digest*,³ compiled nearly a century ago. It includes: *Anæmia*, *arthritis*, *auditorii meatus affectus*, *aurium vitia*, *bilis*, *calida*, *capillitii resectio*, *capillitium prolixum*, *capillorum denigratio*, *capitis prava conformatio*, *catarrhus*, *cerebri inflammatio*, *cerebri laesio*, *coitus*, *collum laesum*, *cranii caries*, *dentium vitia*, *dura mater vitiosa*, *ebrietas*, *exophthalmia*, *febris*, *flatus*, *frigida*, *gastrica vitia* (*diaetæ errores*, *consensus*), *hepatis vitia*, *hydatides in cerebro*, *hydrocephalus*, *hypochondriasis*, *hysteria*, *insolatio*, *lactatio*, *lunae influxus*, *meningum vitia*, *menstrua*, *menstruorum suppressio*, *mercurius*, *moeror*, *nares affectæ*, *nicotiana*, *odores*, *opium*, *orgasmus*, *pericranii vitia*, *pituita*, *plethora*, *plumbum*, *polypus narium*, *rheumatismus*, *renes affecti*, *scorbutus*, *splenis vitia*, *suturæ nimis arctæ*, *syphilis*, *tabacum*, *uterus* (*per consensum*), *vermes intestinales*, *vestimenta* (*arctantia abdomen*, *collum*), *vigiliae*, *vinum*.

This list, in the main an accurate one, is of interest as showing what careful clinical observers our forefathers were. The one important omission is eye-strain, which has only been recognised within recent years. It will be observed that irritation in connection with the ears, nose, and teeth is included in the list of causes.

¹ See Kühn's edition of his works, Lipsiæ, vol. xii., p. 498.

² "De Anima Brutorum: De Dolore Capitis," Lond. 1672. cap. i.

³ "Literatura Medica Digesta," Tübingæ, 1808, vol. i., pp. 214-219.

I propose to group the causes of headache as follows :

Heredity.

Age.

Sex.

Time of Day.

Exercise.

Atmospheric conditions.

Mental states.

Disorders of the scalp.

Disorders of the pericranium and cranium.

Intra-cranial disease.

Injuries to the head.

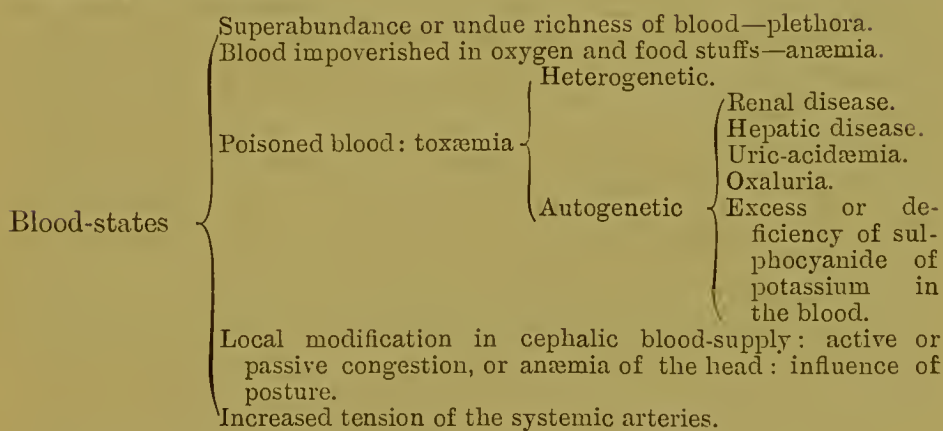
Disorders of the eyes.

Disorders of the nose.

Disorders of the pharynx.

Disorders of the ears.

Disorders of the teeth.



Disorders of the digestive organs.

Disorders of the reproductive system	{	Influence of menstrual rhythm.
		Puberty.
		The climacteric.
		Abnormal menstruation.
		Pregnancy and lactation.

Syphilis.

Gout.

Rheumatism.

Sleep.

Insanity.

Epilepsy, hypochondria, hysteria.

Fever.

Malaria.

It need scarcely be said that the above is very far from being a logical classification of headache or even of its causes ; logical classification exacting that each class shall exclude all comprised in the others. Applying this test, it at once falls short ; for—to take one instance only—disease of the digestive organs and toxæmia are put under separate heads, yet it is almost certain that the former produces headache chiefly by poisoning the blood. It is, however, as impossible to give a logical classification as one based on symptoms : happily, the clinical classification of which alone the case admits, meets all practical needs.

We must ever bear in mind that the causation of disease is extremely complex. We may perhaps speak with some dogmatism of a broken limb as having only one cause, viz., some form of violence ; but in such a disorder as headache we shall generally find that many causes are at work, and we may often cure it by removing any one of these. Let us suppose an individual to have an innate tendency to megrim, to be markedly astigmatic, and to suffer from adenoid vegetations in the post-nasal space. Let us further suppose him to be taking a highly nitrogenous diet. In such a case we might possibly cure his headache by removing any one of these factors in causation. If, *e.g.*, we could charm away that peculiarity in nervous organisation which is the central factor, none of the others would alone be competent to set up the disorder ; but, on the other hand, failing to touch the main cause, we might yet give the desired relief by curtailing the nitrogenous diet, removing the adenoids, or correcting the astigmatism.

Another point to be kept steadily in mind in considering the causation of headache, as indeed of any disease, is the interdependence of causes. The obtrusive cause is often but one link in a long chain of morbid workings. Thus, the obtrusive cause may be menstruation, fatigue, or nasal disease ; but the more immediate cause may be a state of the eyes induced by one of these, each of which may itself set up headache in divers other ways. Wherefore the causation is often infinitely complex.

Our object is to trace every factor in the chain of causation, and to attack each individually. We must never imagine that we have satisfactorily diagnosed a case of headache because we have discovered one cause of it, however potent.

CHAPTER II.

HEREDITY—AGE—SEX—TIME OF DAY.

Heredity.—It has often surprised me that writers should spend time in discussing whether this, that, or the other disease is hereditary, since no truth is more terribly insistent than that of the inheritability of all disorders.¹

Numerous authorities have referred to the hereditability of headache. Thus, Willis² observes that it is “often delivered from the parents to the children;” and Wepfer,³ Bonetus,⁴ Calmeil,⁵ Henoch,⁶ and many others, write in the same strain.

It is obvious that headache is inherited through the transmission, by parent to child, of one or more of the many conditions which predispose to it, such as ocular, nasal, and dental defects, the uric acid, nervous, and other diatheses.

Age.—While organic headache (*e.g.*, from meningitis or tumour of the brain) is not influenced by age, purely functional headache apparently shows little tendency to occur at the extremes of life, especially at the latter extreme. It is of course impossible to speak positively regarding the sensations of the child while it is still unable to make its feelings known, yet it seems probable that infants and very young children enjoy comparative immunity from headache. This conclusion

¹ See “The Causation of Disease,” by the author, Lond. 1889, p. 318.

² *Op. cit.*, p. 107.

³ Wepfer writes of a case: “Malum est aliquo modo hæreditarium, nam his Domina mater obnoxia fuit” (“*Observ. de Affect. Cap.*”), p. 85, Obs. xxxix.

⁴ “Mulier formosa et juvenis. . . . Cephalalgia hereditaria obnoxia fuisset.” (*Op. cit.*, p. 14.) This is quoted from Willis.

⁵ “Library of Medicine,” vol. ii., p. 153.

⁶ “Lectures on Children’s Diseases” (New Syd. Soc.), vol. i., p. 350.

is alike consistent with the low degree of evolution of the nervous system at this time, and with the absence of many sources of peripheral irritation which in later years are calculated to excite headache, such as eye-strain, nasal irritation, and mental pressure. Cheadle has called attention to a continuous headache which occurs soon after the skull closes, subsiding gradually ;¹ and it has further been asserted that the eruption of the temporary teeth may cause headache, not without some show of probability, seeing that the eruption of the permanent teeth, notably of the wisdom teeth, is an undoubted cause.²

Very young children may suffer from ear-ache, which often radiates to neighbouring parts, and may involve one-half, or indeed the whole, of the head. Decayed teeth are responsible for many of these ear-aches ; sometimes they set up the pain independently of organic disease of the ear, but more frequently by causing inflammation of the tympanum or meatus.

These considerations notwithstanding, headache is comparatively rare during the first few years of life, but we find it rapidly increasing in frequency from the age of four upwards—above all, when children are sent to school ; thus it already begins to be common at five years of age.³ According to Treichler, one-third of the children attending the schools in France and Germany suffer from headache ;⁴ and Sir J. Crichton Browne, on visiting a school and asking those children who were liable to it to hold up their hands, found that a large proportion responded.⁵ Parents are continually bringing their children to the doctor on account of headache. The child, we are told, is well when away from school, but the headache returns directly he goes back. In almost all of these cases, supposing that there is no malingering, the eyes are at fault, and the headache is permanently cured by providing the child with suitable glasses. Another common cause of headache in

¹ *Brit. Med. Jour.*, March 4, 1882, p. 307.

² See Part II. chap. xii.

³ "Children, especially girls of seven years of age on to puberty, are very liable to headaches, sufficiently severe to lay them up for part of a day, or perhaps longer . . . Frontal headache is by far the commonest form of reflected pain." ("The Diseases of Children," Ashby and Wright, 1889, p. 418.

⁴ Quoted by Sir J. C. Browne, *Brit. Med. Jour.*, 1880, vol. ii., p. 530.

⁵ See Paper by E. Herman, *Med. Times and Gazette*, 1884, vol. ii., p. 742.

children is some nasal defect. Joal holds this to be the great cause of the so-called "growing headache" (*céphalée de croissance*) referred to by Charcot, Blache, Keller, and others.¹ H. Bennett attributes school headache to defective ventilation of class-rooms,² a cause which must not be overlooked. Another is over-pressure. Stephen Mackenzie, reporting on the results obtained by a collective investigation committee into the origin of chorea, writes: "Headaches are stated to occur in twenty-six per cent. of those cases attributed to mental overwork, while they are recorded in but sixteen per cent. of the remaining cases in which no mental overwork is noted." Another writer records eleven cases of what he terms "adolescent headache." The patients (all but one, boys) came of a rheumatic or neurotic stock, were at the period of most active growth, and were free from any optic trouble. Over-pressure at school appears to have been the chief exciting cause.³ It seems doubtful whether we can correctly speak of a "growing headache,"⁴ of a headache, namely, which stands in definite relation to the growth of the body, unless it be the headache which is so common in the girl at puberty, and which is distinctly connected with the rapid evolution of the body, notably of the reproductive system. Puberty is recognised on all hands as a period most fruitful in neuroses of every kind. Then it is that epilepsy, insanity, hysteria, megrim, are apt to make their first appearance.

The woman, during the whole of her reproductive life, and for some time afterwards, is peculiarly liable to headache.⁵

Ashby and Wright describe a headache from which girls of from 10-12 years of age are apt to suffer. It comes on irregularly, perhaps once or twice a week, is often accompanied by sickness, and may be sufficiently severe to incapacitate from

¹ *Ann. des Mal. de l'Oreille*, vol. xiv., p. 265. See also Simon, *Med. Standard*, May 1891.

² *Brit. Med. Jour.*, 1880, vol. ii., p. 530.

³ *Arch. de Neur.*, 1883, vol. vi., Nos. 16 and 17. See also article by R. Blache, *La Revue Mens. des Mal. de l'Enfance*, 1883, vol. i., pp. 117, 165.

⁴ Ollivier, in discussing the headache of growing children, maintains that there is no special type that can be regarded as due to period of growth. *Med. Age*, Detroit, Dec. 28, 1889.

⁵ For the headache of puberty, as also that of the climacteric, see Part II. chap. xxiii.

work or play.¹ They hold it to be sometimes distinctly hysterical, the pains being shooting or boring but rapidly disappearing under the influence of excitement, and the patients manifesting the hysterical craving for sympathy, and running the danger of lapsing into chronic invalidism. They further point out that while such headaches are commonest at puberty, they may be present in boys and girls only nine or ten years old.

I have had no experience of these hysterical headaches, but with the first kind described I am familiar—*i.e.*, with a headache which, though not distinctly megrim, approaches genuine megrim in type. *True* megrim, however, may occur in children. My experience, indeed, accords with that of Henoeh, who contends that it is nearly as common in the child as in the adult.²

Young men on adopting sedentary occupations, especially those which entail close use of the eyes, are liable to chronic headache. This is frequently owing in great measure to some fault in accommodation or fixation. During school-life, when a considerable part of the day is spent in active outdoor exercise, and when the general conditions of life conduce to health, the vigorous tone of the intra- and extra-ocular muscles may enable the individual successfully to overcome a refractive error or muscular "insufficiency"; but under the less healthy conditions of his maturer years, the latent defect is apt to display itself, and headache ensues. I shall return to this subject later.

Headache, again, often shows itself for the first time at the period of commencing presbyopia, at about forty.

The comparative freedom of elderly, and especially of aged people from headache is well known. "I have observed in numberless instances," writes Heberden, "that headaches almost always become milder, and generally vanish towards the decline of life."³ John Wesley said of himself, "I am as strong at eighty-one as I was at twenty-one, but abundantly more healthy,

¹ "The Diseases of Children," Ashby and Wright, 1889, p. 419. See also "The Recurrent Headache in Children," by Francis Warner *Brit. Med. Jour.*, Dec. 6, 1879, p. 889.

² "Lectures on Children's Diseases," E. Henoeh, vol. i., p. 349 (New Syd. Soc.).

³ "Commentaries," etc., 3rd edit., Lond. 1806, p. 93.

being a stranger to the headache and other bodily disorders which attended me in my youth.”¹ The immunity which age often confers is especially striking in the case of megrim, for the disappearance of headaches which have periodically incapacitated an individual through the chief active years of life cannot fail to impress him. Haig explains it by assuming that the uric acid tends with advancing years to be stored away in the joints, owing to certain anatomical changes which then take place in them, in consequence of which the blood is not so liable to those periodical saturations with it which would appear to sometimes constitute the immediate cause of the megrim seizures.

Whatever the true explanation, we must bear in mind that age brings with it a general blunting in the whole realm of sensibility; and hence many sources of irritation—from the eye, ear, and other special-sense-peripheries—are cut off. The emotions also become less intense, and as a consequence emotional excitations less pronounced. Few bad teeth, moreover, then remain to cause trouble, and the complete quiescence of the reproductive organs in old age removes another potent source of headache, especially in the woman.

Probably the chief cause of chronic headache in old people is granular kidney. Persistent headache suddenly making its appearance after middle life should always arouse a suspicion of it.

But while old age is generally free from headache, the period of what may be called elderliness—*i.e.*, from fifty to seventy—is by no means exempt from it,² especially in the case of the woman; for, although the climacteric frees her in large measure from nervousness, it is quite common to find her for many years after this period the victim of nervous bouts, of which headache is a prominent symptom, lasting for days, weeks, or months. These attacks diminish with advancing

¹ Quoted in the *Echo*, July 18, 1892.

² Vaughan regarded headache as most frequent at about forty-five years of age. “Essay on Headachs,” Lond. 1825, p. 111. (It will be noticed that “headache” is here spelt without the final *e*. Such was the invariable custom down to within forty or fifty years ago. Thus we meet with this spelling in the seventeenth-century translation of Willis’s works, and in so recent a publication as Copland’s “Dictionary of Medicine.”)

years, and are comparatively rare after seventy. I have, however, seen them as late as eighty:—

F. æt. 80. For three months has suffered from headache, depression, flushes, and other nervous symptoms. The pain is shooting, and involves all parts of the scalp. It is greatly increased upon lying down; she feels then “as if she would go out of her mind.” Had a similar attack a year ago.

Sex.—Headache, during the reproductive period of life at all events, is far more frequent in women than in men. This is doubtless due chiefly to the close association between headache and the menstrual rhythm, added to which women are probably more exposed than men to conditions tending to produce malnutrition, which of course powerfully predisposes to all sorts of nervous symptoms, headache among the rest.

Many authors have alluded to this greater frequency of headache in the woman. Symonds found the proportion of headaches in men and women as 16:76, while Herman puts it as 26:65.¹ There is, it should be here remarked, no such preponderating liability of the female sex to megrim, which, according to Liveing’s² observations, is only slightly more common in the female than in the male sex, and so far as *classical* megrim is concerned, I have little doubt of the accuracy of his conclusion. Megrim, however, frequently occurs in an ill-developed form, and if we include cases of this kind in our calculations, we shall find, I believe, that the disorder is very decidedly more common in the female sex.

But though women suffer much more frequently from headache than men, the latter experience the more violent forms of it. This we may explain by the facts, first, that men suffer from syphilis and tumour of the brain, both of which may cause severe headache, far more often than women; and secondly, that the former are more liable to severe pain, wheresoever situated, than the latter—to wit, angina pectoris and epileptiform tic.

Time of Day.—Headache, like many other nervous symptoms, is often worst in the morning, wearing off during the

¹ See Herman’s Paper, *Med. Times and Gaz.*, 1884, vol. ii., p. 742.

² “On Megrim,” etc., Lond. 1873, p. 22.

day.¹ It is probable, as Haig has insisted, that the uric-acidæmia which characterises the early part of the day is causally connected with the peculiar irritability of the nervous system then so apt to prevail, but I do not believe that this is the whole explanation of it. Sleep exercises a profound influence on the nervous system, quite apart from any effect it may have on uric acid elimination. Nor must we neglect other influences which have been at work during the night, such as the horizontal posture, possibly also an ill-ventilated bedroom and mouth-breathing, which latter is certainly more common during the sleeping than the waking state.

According to Vaughan, headache is most frequent in the morning and evening, tending to remit at mid-day.² Such periodic headache is probably often due to the uric-acidæmia of the morning alkaline tide. It is well known that megrim most frequently begins at this time.

Some headaches increase in severity at night-time. This is especially the case with syphilitic headache, a fact which has long been known.³ So-called rheumatic headache also is said by many writers to be most frequently at night.⁴

I have noticed that severe headache of the neuralgic type is often aggravated at night-time, even when there is no suspicion of syphilis. Sometimes headache begins at about three or four o'clock in the morning:—

Is generally awaked by headache at about 3 o'clock A.M.

For the past twelve months has been subject to headache (of the megrinous type), which begins about 4 o'clock A.M.

¹ See "A Treatise on Headachs," by G. H. Weatherhead, Lond. 1835, pp. 24, 34.

² "Essay on Headachs," Lond. 1825, p. 82.

³ "Cephalalgia venerea horis potissimum vespertinis vehementior esse solet et lectuli calore exasperatur." ("De Dolore Capitis," J. F. Stuckens, Brux. 1787, note *d*.)

⁴ Elliotson contended that this is the case when the external parts of the head are involved, the pain being worst in the morning when the internal parts are implicated, owing, he supposed, to the congestion of these structures, from the long-continued horizontal posture (*The Lond. Med. Gazette*, Dec. 29, 1832.) According to Copland, the "rheumatic headache is generally aggravated in the evening and alleviated in the morning and by warmth" (Copland's "Dict. of Med.," Lond. 1844, art. Headache, p. 148.)

CHAPTER III.

EXERCISE.

WITHIN proper limits exercise is one of the best safeguards against all neuroses, since it strengthens the nervous system ; but sudden exertion in those unaccustomed to it, and exercise which produces fatigue, are common causes of headache.

Several writers have commented on this factor in the production of headache. Thus, Hippocrates alludes to headache arising from gymnastic exercises—running, walking, hunting, and “unseasonable labour” of any sort ;¹ and Willis² gives “vehement” exercise, and Sennertus³ “excessive” exercise as a cause. Pariset alludes to the effect of “immoderate” exercise, whether in walking, riding, or driving, in producing headache ;⁴ and Liveing insists upon the similar influence of exertion and fatigue.⁵ In some of his cases of megrim the attack was brought on by the lifting of heavy weights, and by such violent exercise as running. He adds to these causes of headache railway travelling, which operates chiefly by jarring vibration. Simple walking also causes jar, and though of itself it may be insufficient to initiate headache, it may aggravate it when present. Thus a patient will complain that if he “puts his foot to the ground in walking, the head feels as if it were coming to pieces.” In cases of this kind, the slightest movement may bring on the pain. Several of my patients have testified to this ; one note runs : “Severe headache ; is afraid to move.”

¹ Works, translated by F. Adams, Lond. 1849, p. 331. See also Galen, Kühn's edit., vol. xv., p. 900. ² *Op. cit.*, p. 106.

³ “Danielis Sennerti Opera,” Lug. 1650, tom. ii., p. 530.

⁴ “Dict. des Scien. Méd.,” 1813, tom. iv., art. Céphalalgie, p. 420.

⁵ *Op. cit.*, pp. 43, 49.

Of the various kinds of exercise, sudden exertion is probably the most likely to occasion headache, especially in those unaccustomed to spasmodic efforts. The lifting of heavy weights is a familiar instance. If the exertion is accompanied by stooping, as in pushing a lawn-cutter, it is doubly apt to set it up. Pariset was of opinion that the headache results from cerebral congestion, and Liveing alludes to this hypothesis. Violent exercise does undoubtedly cause congestion, not only of the brain, but of the entire head (probably by the frequent fixation of the chest involved by successive efforts) and if this explanation is correct, we can understand how, conjoined with stooping, it is so especially apt to cause headache. In this connection it is noteworthy that a paroxysm of coughing is a common cause of headache. The sudden effort is attended by congestion of the head, which in a long fit of coughing may become extreme.¹ The influence of such a fit on capillary blood-pressure is well displayed by the extensive conjunctival ecchymosis which sometimes results from a paroxysm of whooping-cough, as also by the extreme puffiness of the lids, which may enable us at once to recognise the malady. The same puffiness may be seen after a violent fit of retching, and this, like coughing, may cause headache.² If marked effusion can occur in the circum-ocular tissue as the result of coughing and vomiting, one sees no reason why it should not occur in other tissues of the head, both within and without the skull. It probably does, and the wonder is, therefore, that more serious symptoms do not frequently result.³ That they do sometimes is well shown by a case referred to by Vaughan,⁴ of a girl who, during a violent paroxysm, forced two ounces of the brain through an opening in the skull. Vaughan

¹ Selig refers to the effect of laughing on a case of headache. "Observationes," Lipsiæ, 1795, p. 175.

² I have known granular kidney falsely diagnosed from the presence of puffiness of the lids thus induced. Another cause of this puffiness is eye-strain.

³ A. Lusitanus records a severe case of headache—*a vomitu contractu* (A. Lusitani "Curationum Med. Centuria," etc., p. 700, Burdig. 1620); and one of Wepfer's patients complained thus: *Dolor me cruciabat . . . imprimis inter respirandum, aut alvum exoneraturus*. "De Affect. Cap.," p. 80.

⁴ "Essay on Headachs," Lond. 1825, p. 175.

mentions this case when treating of the effect of coughing on headache. Symonds attributes the headache which follows upon an epileptic fit, as well as that which results from violent coughing, to disturbances in the cerebral circulation; but, as he truly says, such often occur without headache, and therefore some other factor must be at work.¹ In the headache from coughing the pain is generally severe. Thus, some of my patients speak of it as "striking," "crushing," "splitting," "unbearable." To one it seemed "as if the head would fall to pieces"; to another, "as if it were opening and shutting" during the coughing. In these cases, the pain involves all parts of the head, and the eyes also. Frontal pain is probably the most common, but many complained of pain in the crown during the cough. The occipital region is apparently the least frequently affected. The pain may also occur in one lateral half of the head, or in a small circumscribed region. The weakest spot is, in fact, picked out; and it is for this reason that the pain is most frequently felt in the forehead, the region *par excellence* of headache.

Giddiness is a well-known result of coughing. One patient complained that during, and for some time after, a fit of coughing, there were "stars before the eyes," as well as giddiness and headache. The "stars" were doubtless produced by dynamic changes in the globes.

Blowing the nose has an effect akin to coughing. In this case, again, the pain is generally frontal.

Laughter, as Vaughan points out, often leaves behind it a pain in the head,² and according to Wright, players on wind-instruments are liable to headache from the passive congestion which the blowing entails.

Fatigue, quite independently of exertion, may cause headache, a fact which must be familiar to most women, especially to such as live in towns. After a long day's shopping or sight-seeing the headache develops, but it generally vanishes readily after a little rest and the inevitable cup of tea. Fatigue is also an important factor in the production of "academy-

¹ Gulstonian Lectures, *Med. Times and Gaz.*, vol. i. 1858, p. 341.

² *Op. cit.*, p. 176.

headache." Mere expenditure of muscular energy is not the only element in the causation of these headaches. In a brisk country walk many times the same energy may be expended without producing the same results. Evidently, then, the continual noise and bustle, the constant stream of objects before the eyes, the standing and loitering, are more effective in producing the fatigue and concomitant headache, than the muscular effort. Probably the accumulation of poisons in the blood is another important element in these cases.

CHAPTER IV.

ATMOSPHERIC CONDITIONS.

ATMOSPHERIC conditions exercise a marked influence upon nervous health. We can conjecture very little as to how they operate, nor do we even know accurately what are the several factors which go to make up the so-called "atmospheric state," but we may roughly group them under (*a*) temperature; (*b*) moisture; (*c*) atmospheric pressure; and (*d*) electrical conditions. The influence of the different (*e*) winds and (*f*) seasons probably operates by modifying one or other of these.

Each will now be considered separately as a factor in the causation of headache.

(*a*) *Temperature*.—The influence of heat in provoking headache has been commented on by numerous writers from Galen downwards—*e.g.*, Paulus Ægineta,¹ Aurelianus,² Willis,³ Montalto,⁴ Sennertus,⁵ and others, have insisted upon the influence of a powerful sun in producing it.

A hot, stuffy room is notably a cause of headache. Here the high temperature is only one among other factors, but its influence is nevertheless decided. According to Haig it

¹ See F. Adams' translation, New Syd. Soc., vol. i., p. 350.

² "De capitis passione," &c. "Generatur . . . sæpius per frictione aut frigiditatæ, aut e contrario solis exustione."

³ "De Anima Brutorum," Lond. 1672, p. 183. "Frigoris et caloris excessus" are given as causes.

⁴ "Archipathologia," Lutetiae, 1616, p. 59. "Externus ardor, vel a sole, vel ab igne contractus" is given as a cause.

⁵ Sennerti Opera, Lug. 1650, tom. ii., p. 530; and Wilks, "Diseases of the Nervous System," 2nd edit., p. 551.

operates by exciting perspiration, and thus increasing the alkalinity of the blood and inducing uric-acidæmia.

A strong sun may induce headache by its powerful effect upon the retinae, but its most disastrous results are traceable to a more wide-spread influence upon the nervous system, as in sunstroke. L. Riverius records a case of sunstroke in which headache was a marked feature.¹ Not only may violent headache be one of the most prominent symptoms of the stroke,² but it is also a frequent after-effect. Maclean, for instance, gives persistent headache as one of the most common sequelæ.³

The following cases are from my note-book:—

M. æt. 10. Six years ago had sunstroke. Since then has suffered from headache on and off.

M. æt. 9. Sunstroke four years ago. Liable to headache ever since, but less so than at first. On one occasion the headache lasted intermittently for six weeks. The pain, which is "splitting," is situated on the crown. It is worse at night, and makes him light-headed.

Handfield Jones⁴ mentions a patient who, after sunstroke, suffered from severe paroxysms of headache preceded by optic phenomena, from which there can be little doubt that they were attacks of megrim.

Cold, as we have seen, has been given as a cause of headache by Aurelianus, Willis, and Sennertus, and many other writers mention it.⁵ Graves alludes to the influence of cold feet in causing headache,⁶ and Vaughan⁷ writes that standing on a damp pavement has often been known to set it up. It should be remembered that cold feet are one of its symptoms, especially of the megrinous variety.

¹ "Observationes," &c., Centuria ii. Obs. 21. Hagæ-Comitum, 1656.

² See, for instance, Wood, *Med. Times and Gaz.*, Sept. 1876, p. 368; and Pirrie, *Lancet*, 1859, vol. i., p. 505.

³ "System of Medicine," Russell Reynolds, vol. ii., p. 165.

⁴ *Med. Times and Gaz.*, Aug. 1865, p. 164.

⁵ Paulus Ægineta (*op. cit.* p. 351); Frank Hoffmann, quoted by H. E. Cotin, "De la Céphalalgie," 1847, p. 13; and Tissot, *op. cit.*, p. 386.

⁶ *The Dublin Jour. of Med. Chir. Science*, May 1833, p. 153.

⁷ "Essay on Headachs," Lond. 1825, p. 155.

(b) *Moisture*.—A moist air has been said to promote headache. According to Willis,¹ snow and rain may cause it; and Montalto gives “*nebulosa, pluviosa aëris constitutio*”² as a cause. Rank, also, observed that a moist atmosphere produces a certain kind of headache.³ One way at least in which snow may induce headache is by its dazzling effect upon the vision. People who go to reside in lands of perpetual snow often suffer from headache until they become accustomed to the unwonted retinal stimulation.

(c) *Atmospheric Pressure*.—F. I. de Lislie has an article on headache resulting from “barometric depression.”⁴ He claims to have observed in different parts of the world a connection between a low atmospheric pressure and frontal headache. During five days of low pressure (29°–29·4°), he noticed among members of his household and his acquaintances, frontal headache more or less intense, accompanied in some cases by languor and a “bruised sensation” in the lower extremities. This headache was somewhat relieved by guarana powder. The same or very similar symptoms, he asserts, occur at Gibraltar, when the east wind blows, and during the sirocco in Syria, the hot winds of Australia, and the pamperos of South America, to all of which winds a depressed state of the barometer is common. Vaughan also alludes to the influence of a low barometric pressure.⁵

Whether the effects observed during such depression are due to it directly, or to some atmospheric conditions accompanying it, it is at present impossible to say.

(d) *Electrical States of the Atmosphere*.—The atmospheric state preceding or accompanying a thunderstorm is a well-known cause of headache. The modification in barometric pressure which then occurs probably plays a chief part in the result, but a peculiar electrical state of the atmosphere possibly also aids in it. Labarraque⁶ and Symonds⁷ allude to the influence of thundery weather on headache, while Symonds affirms that

¹ *Op. cit.* p. 107.

² “*Archipathologia*,” p. 59.

³ Quoted by Labarraque, “*Essai sur la Céphalalgie*,” p. 21.

⁴ *Med. Times and Gaz.*, vol. ii., 1873, p. 676.

⁵ *Op. cit.*, p. 158.

⁶ *Op. cit.*, p. 21.

⁷ *Gulstonian Lectures*, *Med. Times and Gazette*, 1858, vol. i.

the atmospheric state which precedes and accompanies a snow-storm acts similarly.

(e) The *direction of the wind* has a decided influence on headache. Galen makes frequent allusion to the influence of the south wind in causing languor and heaviness in the head,¹ and, according to Montalto,² Hippocrates made a similar observation. Sennertus gives "ventus aquilonaris" and "austrinus,"³ and Willis, the north wind, as causes of headache. Bartholinus refers to the case of a patient who suffered from the most violent hemicrania whenever the wind blew from the north.⁴ Symes Thompson gives a cold, raw, north-east wind as productive of headache.⁵ In my experience, any sharp biting wind is apt to cause it.⁶

(f) *Season of the Year*.—Willis reckons "anni mutationes" among the causes of headache. Probably headache is most prevalent in winter. Such was Heberden's opinion. "Some headaches," he writes, "constantly return at spring or autumn. A few are most troublesome in summer, but more in winter."⁷ Similarly, Vaughan⁸ observes that they are most common during cold weather, when the action of the skin is diminished. Haig has noticed that megrim is better in the summer than the winter months, a circumstance attributable to the smaller quantity of meat consumed during the former, and to the more active outdoor life then led. On the other hand, a writer in the *Practitioner* regards summer and hot weather as tending to induce the megrim-seizures.

¹ See, for instance, Kühn's edit. of his works, vol. xvii., part. i. p. 33; part ii. p. 609; vol. xvi., p. 412.

² *Op. cit.*, p. 59.

³ Sennerti Opera, Lug. 1650, tom. ii., p. 530.

⁴ T. Bartholini, "Acta," Hafniæ, 1677, vol. iii., p. 108.

⁵ *Med. Press and Circ.*, 1878, p. 501.

⁶ It should be remembered that the direction of the various winds varies with locality. Hence the effect of a given wind in one locality may be very different from that of a wind from the same quarter in another locality. Compare for example the east winds of Britain and the Atlantic seaboard of the United States.

⁷ "Commentaries," 3rd edit. 1806, p. 94. On the other hand, Montalto quotes Hippocrates to the effect that winter is the season "most favourable to headaches."

⁸ "Essay on Headachs," Lond. 1825, p. 152.

I may here mention, if only for its historic interest, that the moon has been supposed to exercise an influence in the production of headache. Thus, Willis mentions the "greater aspect" of the moon, by which, I presume, he means the full moon, as conducive to headache;¹ while, according to Montalto, sleeping in the moonlight has been reckoned among its causes.² *Lunæ influxus* has also been given.³

It is probable that the influence of the seasons varies according to locality, mode of life, and individual idiosyncrasy.

¹ But Willis also alludes to the greater aspect of the sun. See Liveing's remarks on this head, "On Megrim," Lond. 1873, p. 43 *n*.

² "Somnus item sub lucente Luna inter cephalalgiae causas recensetur" (*loc. cit.*).

³ Ploucquet, "Lit. Med. Dig.," p. 217.

CHAPTER V.

MENTAL STATES.

WE may divide the mental causes of headache into sensory, emotional, and intellectual. Thus, an acute sensation, as from an intense irritation of the retina; a strong emotion, as rage; or intellectual strain, as in prolonged or concentrated attention, may set it up.

Sensory.—Impressions made upon the end-organs of sight, hearing, and smell may induce severe headache.¹ Their tendency to produce this result may be explained on the assumption that the centres of these special senses are very closely connected with the common-sensibility centres of the head.

Practically, all parts of the body, with the possible exception of the brain, are capable of sensation. We may for convenience speak of this as "common sensation" as distinguished from the special sensations of sight, hearing, taste, smell. Now, just as, on the psychical side, these special sensations have differentiated from common sensation, so on the physical side the nervous mechanisms which belong to the one have differentiated from the nervous mechanism which belongs to the other. The organs of special sensation being situated in the head, it follows that they have differentiated from that part of the nervous system which belongs to the common sensibility of the head—*i.e.*, the nervous mechanism implicated in headache. Thus, the retina and optic nerve have differentiated from the

¹ In this connection the following quotation from the "Sepulchretum" of Bonetus is interesting (Lug. 1700, p. 56): "Lux nimia dolore afficit oculos, sonus fortis, aures; odor gravis et acer, nares; sapor mordens, linguam et palatum."

nerves of common sensation belonging to the globe orbit and neighbouring parts, and the optic centres in each higher level from the centres of these same nerves of common sensation. Hence the anatomical connection between the two is very close, and as a consequence, disturbance in the one is very apt to set up disturbances in the other. Similarly in regard to the other special senses: the auditory nerve has differentiated from the nerves of common sensation belonging to the ear and its neighbourhood, and the centres of the former from those of the latter; and so also with respect to taste and smell.

If this argument is sound, it follows that any strong impression made upon the organs of special sense must, from the close connection of their centres with the common sensation centres of the head, commote the latter, so tending to cause headache; and conversely, that headache must tend to implicate the special sensations.

The organs of special sense are the most sensitive in the body, and seeing that during waking hours they are kept in more or less constant stimulation, we are able to explain how it is that headache is the most common of all aches. We are also able to explain why a bright light causes pain in the orbit and forehead, and a loud noise pain in the ear, the disturbance spreading from the optic and auditory centres to the centres of common sensation from which they have differentiated. Conversely, we are able to explain why pain in the forehead and eyes interferes with sight, and pain in the ears with hearing (a fact of which I have satisfied myself); and further, why headache, more than any other ache, interferes with mentation. For the commotion of the centres of common sensation of the head which occurs during headache, causes disturbance in the special sense centres, and so interferes with the formation of concepts and percepts.¹

(a) *Sight*.—We must clearly distinguish between headache resulting from undue stimulation of the retina, and that which results from eye-strain—*i.e.*, strain of the intrinsic or extrinsic

¹ The above views are set forth in greater detail in a paper by the author on "Headache considered in Relation to certain Problems in Cerebral Physiology," *Brit. Med. Jour.*, April 8, 1893.

muscles of the ball. Headache from eye-strain comes through the fifth nerve, and will be treated of in a separate chapter.

Here we will consider retinal irritation only. It is a matter of common, everyday observation that bright light and vivid colours are apt to induce headache. Nothing more readily excites an attack of megrim than a dazzling light, a fact of interest when we remember how apt the visual centres are to be implicated in this disorder, as shown by the frequent occurrence of *teichopsiæ*. No doubt direct irritation of the retina is partly responsible for the headache which so often mars enjoyment at the theatre or picture-gallery, and which is the penalty for work at the microscope.

Strong sunlight not uncommonly causes headaches in those who, like the dwellers in the "murky settlements" of London fogs, are not habituated to it. Thus they find it difficult to tolerate the bright light of the country or seaside during the first days of their summer holiday, especially when this is powerfully reflected into the eye from below, as for instance from a chalky road, light coloured sands, or the sea.¹

It is important to note that the retina (or more accurately, perhaps, "the visual system") is peculiarly sensitive in many diseases of the eye, such as keratitis, conjunctivitis, and iritis; and that a bright light is under these circumstances more than ordinarily likely to induce headache. The retina is also apt to share in the irritability of a jaded or exhausted nervous system, and at such times undue stimulation of it not infrequently causes headache. Moreover, the sensitiveness of the retina is often increased during headache, which is thus readily aggravated by strong light. This fact, as well as the influence of bright light in exciting headache, was recognised by the ancients. Thus, in a passage quoted elsewhere, C. Aurelianus observes that during a paroxysm of headache the eyes shun the light,

¹ I imagine that the tolerance which comes after a few days' exposure to the strong light is, in some measure, due to an increase in the pigment of the choroid (and retina?). It is the abundance of pigment in the eye of the negro which, by preventing that reflection and re-reflection from the shining sclerotic which occurs in the albino, enables him to endure the fierce glare of the tropical sun, and, seeing that the colouring matter in the skin may, in a few days, be notably increased by exposure to bright sun-light, it would be strange were no such increase to take place in the choroidal pigment also.

and Paulus Ægineta gives a bright light as a cause of headache. Later writers constantly insist upon the same fact—*c.g.*, Fordyce tells us that during the pain the eye sinks in the orbit, *nec pati valet lumen*,¹ and Heberden observes that too much light will always make a headache worse.² Among more recent writers, Symonds and Liveing insist upon the same fact.

(b) *Hearing*.—Loud noises are apt to induce headaches, as many writers testify.³ I find young soldiers learning artillery practice are subject to it, and one of my patients complained of a darting pain through the temples on hearing a loud noise. The effect of noise is, however, most noticeable during headache, when the slightest sound may aggravate the pain to such an extent that the sufferer craves complete quiet.

(c) *Smell*.—Various strong odours have the power of initiating headache, and of aggravating it when already set up. It was probably this fact that led the celebrated Arabian physician Rhases to the belief that those endowed with an acute sense of smell are liable to headache.⁴ It is noticeable that it is a matter of indifference whether the odours are offensive or agreeable, their headache-producing power seeming to depend upon their strength alone. Thus we find Paulus Ægineta stating that “headaches may be increased by strong-smelling things which fill the head,” Sennertus giving “odor gravior”⁵ as a cause of headache, and Labarraque referring to the headache which flowers exhaling strong perfume are apt to cause. Avicenna, however, gives “fœtid odours,” and Symonds “disagreeable odours” as a cause. The smell of turpentine (fresh paint), and of hydrocyanic acid, animal exhalations (as in the mortuary),⁶ the perfume of certain flowers—*c.g.*, lily, rose, hyacinth, stephanotis⁷—and the essence of various roots and seeds, as anise and valerian, are very generally accredited

¹ “*Historia Febris Miliaris et de Hemisrania*,” Lond. 1758, p. 81.

² “*Commentaries*,” Lond. 1806, 3rd edit. p. 97.

³ Paulus Ægineta, Symonds, Liveing, Wilks, among others.

⁴ See Montalto, “*Archipathologia*,” 1616, p. 65.

⁵ Sennerti Opera, Lug., tom. ii., p. 530.

⁶ Liveing. One of my patients said that the smell of stabling caused headache.

⁷ Vaughan writes: “I have heard of those who could not bear the smell of pinks and honeysuckles, and who were ready to ‘Die of a rose in aromatic pain’” (*Essay on Headachs*, Lond. 1825, pp. 131, 132).

with the power to induce headache. On the other hand, some odours have been employed in its cure. Avicenna, for instance, sought to relieve the headache produced by foetid exhalations by causing the patient to smell fragrant perfumes,¹ and we are all familiar with the application of smelling salts which, however, act rather by mechanically stimulating the fifth pair of nerves than by exercising any specific influence upon the second pair.

Emotional.—In no mental state is the physical substratum of mind so violently agitated as in strong emotion, wherefore we should expect such emotion to excite neuroses, and, as a matter of fact, almost any neurosis may in this way be set up: chorea, epilepsy, headache, even insanity.² The stronger the emotion the more apt it is to cause headache.

Willis cites among the causes of headache, “*passiones violentæ*,” but we shall presently see that there is another factor besides violence, at all events violence in outward expression, which renders an emotion liable to produce it. Tissot singles out anger as the emotion especially provocative of it. He also mentions “vexation” as a cause, and in reference to this I may say that a number of my hospital patients assign their headaches to “worry,” by which term they doubtless mean vexation rather than anxiety. According to Vaughan, anger and grief are, of all the emotions, the most likely to cause headache.

Practically it may result from any profound emotion—intense joy, or sorrow, or suspense. The mere looking at a play will, by the emotions which it arouses, bring it on, quite apart from the physical conditions of the theatre; just as listening to a fine musical effect may completely prostrate a highly appreciative listener.

To anger, grief, and vexation, as provocatives of headache, Liveing adds the cause above alluded to—viz., excitement; and in this I concur with him. The psychology of excitement has, so far as I know, yet to be written. It is a state of mind which may attach itself to an emotion, but which, nevertheless,

¹ “*Canonæ Med.*” lib. iii., Fen. i., Tract 2, cap. 22, 23.

² The most striking example of insanity thus induced is melancholia attonitans.

may apparently occur independently of any special emotion. We speak of an individual in a rage as being excited, then probably chiefly referring to the dynamic effects of his emotion, but after the anger has passed off, he may remain in a state of excitement, which we may compare to the ground-swell of the sea after a storm; the whole nervous system is in a very different condition from what it was before the emotional outburst. Similarly an individual may be excited when preparing for a holiday; here the excitement may be part and parcel of the pleasure in anticipation, but it may also be something quite distinct from it. Probably in no emotion is excitement more decided, or more hurtful, than in suspense, as when one is in doubt as to the course of an illness, the safety of a friend, the result of an examination or speculation. A mental state very much akin to suspense, and in which excitement may be equally marked, is that which is often experienced on the eve of an examination, or just before competing in a race, or entering a shooting match or other trial of skill.

In all these cases there is little or no outward emotional manifestation, such as there is in violent anger; the individual is in a state of *suppressed excitement*; and there results in consequence an accumulation of nerve tension. Hence suppressed excitement often leads to greater evil than that which finds outlet in muscular action, as in a fit of unbridled rage. Certainly it is, in my experience, of all emotional states by far the most apt to set up headache, and those instances cited above are such as I have actually known to cause it. The influence of emotional temperament is very manifest here. The phlegmatic individual is not readily stirred: he keeps cool, and though, doubtless, he may forego many delights in the emotional sphere which are enjoyed by his more impressionable brother, he escapes a fertile source of nervous disturbance.

While an emotion may excite a neurosis, it may also remove it, temporarily at least. Many will recall the case of the paralysed and voiceless girl who, at the cry of "Fire," suddenly found the use of limbs and voice. Similarly, headache may vanish under the influence of a strong emotion. I have observed this on several occasions. One patient complained of a continuous pain upon the crown which

disappeared "if she had any excitement;" and Burder remarks that cheerful conversation may remove a headache.¹

Intellectual.—Sennertus gives as a cause of headache: "Too great exercise of body and mind."² Whether he is here referring to the emotional or the intellectual side of mind, it is impossible to say, but there are some, *e.g.*, Vaughan,³ Copland,⁴ Cotin,⁵ Symonds,⁶ and Symes Thompson⁷ who state explicitly that excessive intellectual strain is capable of causing headache.

Vaughan says it may be produced by poring over an intricate work, or by the effort to recall something forgotten, or by a painful reminiscence: "A lady whom I know always feels a pain in her head when she thinks of a favourite child who died." Symes Thompson tells us: "Isaac Newton always found that when he worked at the theory of lunar irregularities it made his head ache, but it never ached when studying any other subject." And I have met with a boy who used to suffer from headache while working out his sums but not while engaged in other work.

Undoubtedly many cases of headache which in the past were wont to be attributed to excessive intellectual effort, are really due to eye-strain, and though it is pretty certain that intellectual effort may cause it, it probably does so merely by inducing excitement. It seems to me unlikely that pure intellectuation (if we may use the term), unaccompanied by any decided emotional change, would produce it.⁸

Just as an emotion may cure a headache, so also may intellectual effort. Wilks writes of megrim: "The necessity to do some mental work may sometimes cause the pain to depart."⁹

¹ Copland's "Dict. of Med.," Lond. 1844, vol. ii., art. Headache, p. 147.

² Sennerti Opera, Lug. 1650, tom. ii., p. 530. See also "Archipathologia," 1616, p. 59.

³ *Op. cit.*, pp. 133-135.

⁴ Copland's "Dict. of Med.," Lond. 1844, vol. ii., art. Headache.

⁵ "De la Céphalalgie," Paris, 1847, p. 12.

⁶ *Op. cit.*

⁷ *Med. Press and Circ.*, 1878, vol. i., p. 500.

⁸ The dynamical effects of intellectuation are infinitely less than those of emotion. The one we might compare to the rapid piping of the piccolo; the other, to the united strains of a large orchestra and choir. See "Differences in the Nervous Organisation of Man and Woman," part iii., by the author.

⁹ "Diseases of the Nervous System," Lond. 1883, p. 552.

CHAPTER VI.

DISORDERS OF THE SCALP, PERICRANIUM, AND CRANIUM.

The Scalp.—The scalp plays a not unimportant part in the production of headache. I use the term “scalp” in its strict anatomical sense, to signify, namely, the membrane in which the hair-follicles are imbedded, without any reference to the underlying muscles and aponeuroses, such as those of the occipito-frontalis and temporal muscles.

Pediculi capitis must be placed foremost among the disorders of the scalp capable of causing headache, though the connection is often overlooked.¹ They are very common among the poor of towns. We are all familiar with the girl who comes to the hospital with severe head- or face-ache—her face, perhaps, bandaged up and her whole appearance one of dirtiness and neglect; or, again, with the emaciated woman, often past middle life, of frowsy aspect, with thick matted hair, and racked with agonising headache. Examination of either discloses enlarged lymphatic glands, swarms of pediculi, and perhaps sores in the head.² In such cases as these there is little difficulty in diagnosing the real cause of the trouble, but in others less pronounced it is very often overlooked. Over and over again, when on superficial examination of the patient no pediculi were to be seen, I have traced the origin of a severe headache to their presence, a more careful scrutiny of the scalp,

¹ They are not, so far as I am aware, mentioned by writers as a cause. The nearest reference to them which I have found is dirtiness (*malpropreté*) of the head, given in the article on *Céphalalgie* in the “Grand Dict. Universel du 19ième Siècle,” Paris, vol. iii., p. 738.

² For some reason the glandular enlargement is, I think, apt to be more pronounced in the girl than in the woman.

notably in the occipital region where the covering of hair is thickest, revealing that they, or nits, or both, were abundant.

These parasites evidently cause headache by inducing some anatomical change in the scalp, evidence of which is sometimes, though not always, forthcoming in the form of sores, etc. In all cases, however, there is enlargement of the glands which receive the lymph from the affected part of the scalp, notably of a small gland behind the ear, and of certain cervical and occipital glands; and this enlargement shows that, in spite of the absence of sores, the scalp is definitely affected by the pediculi. There is another factor besides the scalp affection in the production of these headaches—*i.e.*, the low tone of health which generally goes along with the presence of pediculi, and which opens the door to pains of all kinds, notably to pains of a neuralgic character, for poverty and filth produce both ill-health and pediculi; moreover, the latter are apt to fasten upon those whose vitality is depressed. It is for this reason that some of the worst forms of headache are traceable to dirt and starvation.

In these cases the pain may be situated in any part of the head; but perhaps its most characteristic seats are the occiput and the crown; when in the occiput the pain may involve the neck. It is, in the worst cases, very severe, often of a gnawing and burning character, and may—especially if the patient is emaciated and anæmic—be accompanied by neuralgic shootings. Intense soreness is generally present. There is frequently, of course, irritation of the scalp, but not always, if we are to believe our patients.

The relation between the hair and headache is interesting. C. Aurelianus attributed the fact of headache being more frequent among women than men to the excessive pains the former bestow on the hair,¹ and although his view is certainly in the main erroneous, it is a fact that I have met with patients who complained that brushing the hair caused the head to ache. Montalto ascribed the unequal distribution of headache between the sexes to unseasonable and assiduous washing of the head on the part of the woman,² but I have never known it to

¹ "Vehementius fœminas tenet ob diligentium capillorum."—"De passione Capitis."

² "Intempestiva, seu assidua capitis lotio, unde fœminæ plerunque huic malo obnoxie."—"Archipathologia," p. 59.

result in this way, except by producing "cold" in the scalp; cutting the hair may act similarly.¹ Shampooing, on the contrary, generally affords relief.

The mode in which the hair is worn may be a cause of headache. Cotin² and a writer in the *Lancet* both state that dressing the hair too tightly will provoke it. The latter alludes to the fashion of drawing the hair tightly back, and securing it with pins, as a result of which the nerves of the scalp are irritated and neuralgia set up, especially in the second cervical nerves.³ They are doubtless right, women generally finding greatest ease during headache by letting the hair down.

The mere weight of the hair may also be a factor in the production of headache;⁴ so that, in order to obtain relief, a woman will sometimes have her hair cut short. According to Wright,⁵ monks who neglected to shave their heads after having habituated themselves to the tonsure, suffered severe headache.

Under the present heading, the influence of various kinds of headgear on headache must not be neglected. The whole truth on this point lies in Jäger's epigram: "The best covering for the head is no covering at all." Nature has provided both the man and the woman with an amply sufficient protection.⁶ In this respect civilised woman is much better off than civilised man, for her head-dress is often so light and airy, even in this country, that it practically amounts to nothing at all, being pure ornament, and in some lands the women wear no head-covering whatever. Headgear, if heavy, is apt to cause headache, especially if it attains such enormous dimensions as the soldier's busby; but the most injurious head-dress is that which—in addition to being weighty—compresses the scalp within a hard unyielding rim, after the manner of the modern high hat, an invention responsible for a large number of headaches.⁷ It is to be hoped that the time will soon come when

¹ Ploucquet gives "capillitium resectio" as a cause of headache,

² "De la Céphalalgie," Paris, 1847, p. 12. ³ *Lancet*, 1885, vol. ii., p. 124.

⁴ Thus Ploucquet, *op. cit.*, p. 215, gives "capillitium prolixum" as a cause; and Cotin, "des cheveux trop longs."

⁵ "Headaches, their Causes and their Cure," Lond. 1877.

⁶ John Locke wrote: "Nothing more exposes to headaches, colds, catarrh, and coughs, than keeping the head warm." *Ency. Perthenoss.* Edin. 1816, vol. xi., p. 126. Montalto gives as a cause of headache, "nimia capitis integumenta" (*op. cit.* p. 59); and Cotin "une coiffure trop épaisse." *Op. cit.* p. 12.

⁷ Spencer Wells has often met with headaches in secondary syphilis, due

greater latitude will be allowed in the matter of men's headgear, but much might be done to minimise the injurious effects of even the present fashion. For instance, the high hat selected should be the lightest made, and every available opportunity should be taken to uncover the head; there is rarely occasion, for instance, to wear a hat in a railway carriage.¹

Pericranium and Cranium.—Organic affections of these structures may set up violent headache. It is quite unnecessary to discuss in detail all the diseases of the skull and pericranium which may operate in this way. Among them we have to include syphilis,² malignant disease, gout and rheumatism (probably), chronic alcoholism, chronic renal disease, and insanity. In the three last, thickening of the cranial bones as well as of the meninges has been observed.

Cases of localised thickening of the pericranium, with tenderness over the thickened part, and accompanied by headache, have been described by Sir Everard Home, Abercrombie, Burder, Tissot, Ponteau, Crampton, Pearson and Sir Benjamin Brodie.³

as he thinks, to sub-acute frontal periostitis. Such headaches may, he contends, be brought on by the rim of the hat pressing against the forehead. *Gulstonian Lectures*, Symonds, 1858.

¹ It is strange that men have not yet waked up to the absurdity of the modern high hat! Only one argument can be advanced in its favour—*i.e.*, that it is some protection against certain sorts of injuries, such as from a falling tile or a pitch from a horse. Nothing else can be urged in its behalf. It does not shelter from rain, for if rain comes on, up goes the umbrella to protect the hat; nor does it shield the head from the wind, for in a strong breeze one has to exercise all one's ingenuity to keep it on, especially if at the same time there is an omnibus in motion to be mounted, and a bag to be carried; and if perchance it should be blown off, where is the man who can preserve his native dignity while chasing it along the street? Nor does it protect against heat: no one would think of equipping a regiment bound for the tropics in high hats. On the other hand, it has many disadvantages: it is supremely ugly, and offends not only as being so, but by dominating the entire modern fashion, for the individual has to dress in accordance with it; it is expensive; it is a great cause of headache; and it is practically—worst indictment of all—the sole cause of (crown-) baldness. An impartial judge cannot fail to pronounce that the wearing of a ring through the nose is very much less ridiculous than the wearing of high hats—a fashion only rivalled in its absurdity by the practice of tight lacing. It is the duty of medical men to make their influence felt in this matter.

² Frequent mention of headache thus arising is to be found among the older writers. Thus, in the "*Sepulchretum*" of Bonetus, p. 53, there is described a case of "*capitis gravedo a carie ossis frontis*."

³ See *Med. Chir. Review*, Dec. 1829, p. 256; Copland's "*Dict. of Med.*," vol. ii.

CHAPTER VII.

INTRA-CRANIAL DISEASE.

As might be expected, many of the cases of headache recorded by the older writers are instances of gross intra-cranial disease, such as tumour, abscess, hydrocephalus. Examples of this kind abound in the writings of Willis, Wepfer, and others: the "Sepulchretum" of Bonetus contains a large number.¹

In treating of such headaches, we have to consider those arising from disease of (*a*) the meninges, (*b*) the brain.

a. The Meninges.—Headache is an important symptom of all forms of meningitis—tubercular, idiopathic, traumatic, syphilitic, that chronic form which is found in connection with alcoholic poisoning, renal disease, and some forms of insanity (notably general paralysis of the insane) and which manifests itself on post-mortem examination by thickening of the meninges; or the more local forms, such as may occur for instance in connection with diseased bone (*e.g.*, from internal ear-disease), or with tumour, abscess, or other disease of the brain.

I shall only touch upon the headache met with in one or two of these varieties. In tubercular meningitis the pain does not declare itself so early as might be expected, being usually absent in the premonitory stage (Vogel), though all authors are agreed that it is one of the most constant and characteristic symptoms

¹ Thus Obs. 11 is an instance of headache from meningitis; Obs. 23, of headache from abscess, of which many cases are recorded; Obs. 63, of headache from cerebral tumour; Obs. 48, of headache from gummatous affection of the dura mater; Obs. 14, of headache in which there was an abnormal accumulation of serum in the ventricles. Ploucquet (*op. cit.* vol. i. p. 214) gives numerous references.

of the fully developed disease, the other cardinal symptoms being vomiting, optic neuritis, constipation, retracted abdomen, and cephalic pulse. It comes on either with, or just before, the vomiting, generally taking the form of violent paroxysms, which cause the child to scream out, and to put his hands to his head, usually the fore part, from which it has been thought that the pain is most frequently felt there, though it is more likely that it involves the greater part of the head. Jenner points out that the continuance of the pain after the vomiting has ceased, is strongly suggestive of its meningeal origin, and he further observes that the headache of all idiopathic fevers invariably ceases when delirium begins.¹

Syphilitic affection of the meninges occurs chiefly at the base of the brain, in which case pain may result from direct involvement of the fifth nerve.

Gilbert Blane has the following remarks concerning chronic thickening of the cerebral meninges: "One of the most common morbid appearances upon inspecting cases of chronic headache, is a thickening of the membranes of the brain, owing probably to a slow inflammation."² Such thickening is met with in three diseases at least, in each of which headache is a frequent symptom.

Thus (*a*) chronic alcoholism tends to produce inflammatory thickening of the dura mater, and to it the headache of this disorder may, in part at least, be due.³ Similarly in (*b*) granular kidney there is often chronic thickening of the meninges and skull, which doubtless plays some part in the causation of the headache so commonly met with in this disease.⁴ The same remarks apply to the headache of (*c*) general paralysis of the insane, in which the membranes of the brain are markedly affected. Hitzig alludes to the headache which occurs in this affection, alleging that it is apt to be most severe in the morning.⁵

¹ "Diseases of Children," A. Vogel, New York, 1870, p. 349; Ziemssen's "Encyc.," vol. xii., p. 529, by Huguenin; "Maladies des enfants," Barthez et Sanné, Paris, 1887, p. 90; "Disease in Children," Eustace Smith, Lond. 1889, p. 380.

² "Trans. of the Soc. for the Improvement of Medical and Chirurgical Knowledge," London, 1800, vol. ii., p. 210.

³ Ziemssen's "Encyc.," Erb., vol. xi., p. 140.

⁴ Bartels: Ziemssen's "Encyc.," vol. xv., p. 476.

⁵ Ziemssen's "Encyc.," vol. xii., p. 865.

b. The Brain.—It has been already observed that the brain is, in the healthy state at least, apparently devoid of sensibility, and though it has been suggested by many that it may become sensitive under morbid conditions, this is by no means certain. It is well known that cerebral hæmorrhage and softening, and other gross organic disease, may occur without producing the slightest pain, and it is very possible, nay probable, that when cerebral disease does cause pain, it does so through the involvement of the meninges, either (1) directly, or (2) by compression of the brain, as by hæmorrhage, tumour, or abscess, whereby the sensitive membranes are stretched; in such cases there is a greater likelihood of pain if the compression is sudden than if it is gradual. From which it follows that the nearer the lesion is to the membranes, and the more rapidly it extends, the more likely is headache to result.

In encephalitis intense headache is, according to Huguenin, the first symptom in the great majority of cases; it “increases from hour to hour, and is interrupted only by short intervals.”¹

In abscess, if it occur in connection with disease of the cranium, there will necessarily be pain from the beginning, but if it be chronic and deep-seated, it may cause little or no trouble. If a quiescent abscess suddenly increase, it will occasion severe headache. Abscess in any part of the brain tends to cause pain, but is apparently most apt to do so when situated in the frontal lobe. When the cerebellum is involved, the pain is very severe, and generally constitutes a prominent symptom during the whole course of the disease. As in cerebellar tumour, it is usually situated at the occiput or nucha, but it occasionally involves the entire head.²

Chronic hydrocephalus is very frequently accompanied by headache,³ and it is interesting to note, in this connection, that some of the older writers record cases of headache “from separation of the sutures;”⁴ while it is still, I believe, the custom in some parts of the country, for the “wise woman” of the village, when consulted for chronic headache, to take

¹ Ziemssen's “Encyc.” vol. xii., p. 738.

³ See Eustace Smith, *op. cit.*, p. 363. ² See Huguenin, *ibid.*, pp. 763-791.

⁴ “A suturarum dissectione.”—See Boneti, “Sepulchretum.” “De dolore capitis,” Obs. 92.

frequent measurements of the head, with the object of noting changes in its dimensions, and to apply firm pressure in the case of a head that is deemed too large. On the other hand, headache from too tightly closed sutures has also been described.¹

Headache is the most distressing symptom of tumour of the brain, and, according to the principle above enunciated, it is the more severe the more rapidly the tumour grows, and the nearer it is situated to the membranes. Byron Bramwell sums up the causes of the pain thus : (a) increase of intra-cranial tension and consequent stretching of the membranes (which he considers the most common cause) ; (b) direct involvement of the membranes, periosteum, or bones, by the tumour or by the inflammation in its neighbourhood ; (c) direct implication of the fifth nerve, when the pains are apt to be neuralgic.

The pain of cerebral tumour tends to differ from functional headache in that it is continuous,² and *interferes with sleep*, which functional headache as a rule does not. This continuousness, as Symonds observes, is a special characteristic of this form of headache : "the patient goes to sleep with it, it haunts his dreams, and he wakes to a sense of it." Gowers lays great stress on the tendency of organic, as distinguished from functional headache, to interfere with sleep. It must not, however, be forgotten that simple functional headache may likewise disturb it.

The pain in tumour of the brain varies from a comparatively slight ache to agony so intense as to prompt to suicide. It is apt to be paroxysmal, and may even assume an intermittent type. It may increase in the evening or in the morning. Its situation rarely indicates that of the tumour except in the case of tumour of the cerebellum. This latter is bound down by the tense tentorium cerebelli, stretching of which causes the

¹ "A nimis arcta suturarum compagne."—Sec Boneti "Sepulchretum," Obs. 90.

² Sennertus, adopting a very ancient classification, divides headaches into primary, those from disease of the head ; and sympathetic, those from disease elsewhere ; and he writes concerning them ; "Dolor primarius plerumque continenter, et sine intermissione fatigat ; per consensum vero ingravescit et mitescit, prout intenditur vel minuitur affectus in parte, a qua malum capiti communicatur, restc Galeno, in fine 2. de loc. affec."—*Sennerti Opera*, Lug. 1650, tome ii., p. 531.

pain to be felt in the occiput, and very often in the nucha also. Cerebellar tumour has been known to cause pain in the frontal region, and at no other part; in fact this region is the most common seat of the pain in organic, as it is in ordinary functional headache.

When the pain from tumour of the cerebrum is felt in the neighbourhood of the tumour, the latter generally occupies a superficial part of the brain, and in such cases percussion over the site may not only elicit tenderness but the characteristic headache.

It must be remembered that organic headache is not exempt from the laws of headache in general, and therefore whatever tends to aggravate functional headache, such as stooping, a fit of coughing, excess of nitrogenous diet, tends also to aggravate organic headache. Further, organic intra-cranial disease may set up functional headache as well as its own peculiar pain. Thus Hilton maintained that tumour of the brain caused megrim, and it may also, I believe, occasion other forms of headache. It is necessary to bear these facts in mind, just as it is to remember that hysterical symptoms may be the most obtrusive manifestations of organic disease of the nervous system.

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CHAPTER VIII.

INJURIES TO THE HEAD.

PERSONAL experience has taught most people that a blow on the head may produce headache, and external injury to the head is given as a cause by almost every writer on the subject, from the days of the ancients downwards.¹ It is not only simple headache that may be thus excited, but megrim and trigeminal neuralgia also. If the injury be slight the result may be transient, but serious injuries sometimes induce a more or less permanent tendency to headache.

As instances of megrim set up by injury, we may take the cases of Maurice Hoffmann and Douglas Morton. The former, when between four and five years of age, received over the right eye an injury which left a large scar. Subsequently megrim developed, the pain being felt in the situation of the scar.² Morton's first attack of megrim was produced by violently striking the head against the ground in falling from a swing; hemiopia was immediately induced, headache shortly ensuing.³

The tendency for headache to occur at the seat of injury, as in Hoffmann's case, is referred to by Vaughan in the following passage: "I have known the head affected with a pain in a single point, by consequence of a blow on it, which pain extended around that point, and was the less the farther from it, but was for twelve months afterwards renewed by disorders

¹ Galen gives directions for treating headache arising from "contusion" (vol. xiv. p., 320, Kühn's edit.), and from a "blow or fall from a height" (*Ibid.* vol. xiv., p. 319.) Willis says headache may be produced by "a blow, wound, or concussion of the head."

² Quoted by Labarraque, "Essai sur la Céphalalgie," Paris, 1837, p. 24.

³ *Practitioner*, Aug. 1873, p. 100.

of the stomach, as after a debauch ;”¹ and Scott writes of “a middle-aged man who received upon the right side of the parietal bone a blow which penetrated the scalp. The wound healed well, but in a few days he was seized with severe pain over the right side of the head, gradually extending over the whole, with intolerance of light.”² From similar cases observed by myself, I select the following :—

m. æt. 8. Two or three years ago had a severe fall on the back of the head, and has been liable to pain there ever since.

m. æt. 33. Twelve years ago had a fall on the ice, receiving on the left side of the forehead a wound which has left a scar. During the last few months has had headache chiefly in and around the scar; complains of a burning pain there. Nothing in the eyes, teeth, ears, or nose likely to cause the pain.

f. æt. 7. Fall on the head from a swing eight weeks ago. Since then has complained of headache on the crown, and there has been a notable “falling away.”

f. æt. 8. Received a blow on the head three years ago; has complained of headache every ten days since the accident. It is noticed chiefly after school. (This latter fact is, of course, no argument against the headache having been originally excited by the blow.)

Blows on the head are among the many accidents to which children are exposed, and headache is the frequent result. J. Bierbaum records the case of a little boy who for some time after receiving a blow on the head, suffered the most violent paroxysms of headache,³ and cases similar to this, but of less severity, are comparatively common. Children are often seriously upset by head injuries. How frequently do mothers bring small children to the hospital suffering from the effects of a fall! The child mopes, its appetite fails, its sleep is disturbed, there may be a tendency to light-headedness at night, and very often there is headache. These symptoms sometimes lead one to fear meningitis, and it is quite possible that it is more often present in a minor degree and a localised form than is generally supposed.⁴

¹ “Essay on Headachs,” Vaughan, London, 1825, p. 50. See also p. 118.

² *Edin. Med. and Surg. Jour.*, 1835, p. 327.

³ *Jour. für Kinderkrankheiten*, 1863, vols. xl.-xli., p. 164.

⁴ Dr. Barlow at his clinic at Great Ormond Street, used to insist upon the

Victor Horsley¹ refers to cases "where, though after severe blows on the head no organic mischief can be detected, the patient suffers from an intolerable and incapacitating pain in the head, referred to the bone and quite irremediable by drugs." In four such cases, in which there had been pain for periods varying between five and fifteen years, he operated successfully. In one, the trephined piece of bone was eroded by a Pacchionian body (a rare condition); in another, the dura was slightly thickened; and in a third, the removed portion of bone was very vascular. In two of the cases the pain seems to have been confined to the seat of the injury. Horsley does not think that cases of this kind have received sufficient attention, though "several surgeons have published instances during the last fifteen years."²

susceptibility of children to simple (non-tubercular) meningitis after injury and other causes—*e.g.*, pneumonia; and I can recall cases under his care at the time, tending to confirm this view. Similarly, while I was acting as clinical assistant to Dr. Abercrombie, a child was brought to the hospital with hemiplegia which had followed upon a burn on the scalp over the motor convolutions of the unparalysed side. We can only account for the paralysis in this case by supposing a spread of inflammation through the skull to the meninges. Such cases suggest that simple localised meningitis may often pass unrecognised.

¹ *Brit. Med. Jour.*, 1890, vol. ii., p. 1290.

² For case of headache arising from a fall on the head and benefited by a surgical operation, see *Med. Times and Gaz.*, 1885, vol. i., p. 206, by T. Clifford Allbutt.

CHAPTER IX.

DISORDERS OF THE EYES.

AMONG the various peripheral areas through which headache may be excited, what may be termed the "ophthalmic area," stands pre-eminently first. Within this are included the retina, or peripheral expanse of the optic nerve, and the terminal expanses, in the eyeball and its muscles, of the ophthalmic division of the fifth. The following presents, in tabular form, the ways in which irritation of the ophthalmic area in its twofold division may be set up:—

A. Irritation of the retina, due to	{	a. Bright light, especially when photophobia is present.	{	1. Errors of refraction.
		b. Imperfect focussing and fixation, due to		2. Imperfection in the ocular muscles, intrinsic or extrinsic.
B. Irritation of the 5th nerve, due to	{	a. Organic disease of eye, <i>e.g.</i> , glaucoma.	{	1. Errors of refraction.
		b. Eye-strain, or fatigue of ocular muscles, due to		2. Imperfection in the ocular muscles, intrinsic or extrinsic.

Now, any one of these sources of ophthalmic irritation may also be, indirectly, a source of headache. Thus (A) irritation of the retina by *a*, bright light or vivid colours (more especially if there be photophobia), or by *b*, imperfect focussing or fixation, may produce it. In the latter case blurring of the image and double-vision may ensue, and the resulting mental embarrassment or confusion is a possible factor in the causation of the headache.

But a much more potent cause of headache than retinal

irritation is (B) irritation of the 5th nerve resulting from *a*, organic disease of the eye, such as glaucoma, iritis, conjunctivitis, and above all, from *b*, eye-strain—that is, strain of the ocular muscles in looking at near objects, a frequent result of refractive error, or some imperfection on the part of the muscles of accommodation and fixation.¹

I have already attempted to explain why irritation of the ophthalmic area is so liable to set up headache: the visual centres being closely connected with the common-sensibility centres of the head, irritation of the retina is apt to affect these latter; and similarly, the common-sensibility system of the eye being but a part of that of the head in general, irritation of one part of which is apt to spread to others, irritation in the eye may involve the forehead, causing frontal headache. Why it should tend to cause pain in the forehead and temples rather than in the infra-orbital regions, is not quite clear. It is true that the ophthalmic division of the fifth, which supplies the eyes with nerves of common-sensation, supplies also the forehead and temples, but the collection of a number of sensory nerve-fibres into a common nerve-trunk does not necessarily imply any peculiarly intimate connection between the nerve-centres belonging to them. One would expect the continuity of peripheral expanse to be paralleled by a like continuity of central grey matter, and it is by no means plain why the grey matter belonging to the orbit and its contents should stand in closer relation to that of the supra-orbital than to that of the infra-orbital regions.²

¹ The term “fixation” here sufficiently explains itself. It is very convenient to speak of the “muscles of fixation” (in contradistinction to the “muscles of accommodation”) and “errors of fixation.” The latter term appears to me more appropriate than “muscular *insufficiencies*.”

² I have said that “the collection of a number of *sensory* nerve-fibres into a common nerve-trunk does not necessarily imply any peculiarly intimate connection between the nerve-centres belonging to them.” In the case of motor fibres it may do, as Ferrier and Yeo have shown, and in some cases of sensory fibres also. It is certain that such of the fibres of the first division of the fifth as come from the eyeballs have very close central relations, since they serve, in connection with the third, fourth, and sixth nerves, to co-ordinate the complex movements implied in focussing and fixation. But it is not quite clear why such of them as are distributed to the forehead should share in these central relations merely because they happen to run for a short distance in the same nerve-trunk. (See *Note* at end of Chapter.)

In treating of ocular headache I shall not follow the above logical classification, but shall make a threefold division, thus :

Headaches arising from—1. Retinal irritation.

„ „ „ 2. Organic diseases of the eye.

„ „ „ 3. Eye-strain.

1. *Retinal Irritation*.—Headache from this cause has already been treated of under Mental States.

2. *Organic Diseases of the Eye*.¹—All organic affections of the eye, such as iritis, conjunctivitis, tumour, glaucoma—tend to cause headache, which generally involves, chiefly or solely, that side on which the affected eye is situated. In glaucoma the pain is evidently due to increased intra-ocular tension, and the question therefore arises how far such increase may be the cause of headache occurring in other morbid states of the eye. Tension is markedly increased in aquo-capsulitis (the anterior chamber being in this case deepened), in some cases of iritis, and in tumour of the globe,² and it is doubtless a cause of the pain which attends them. But modifications of tension may occur independently of organic affections of the eye; they may, as I have myself observed, attend subtle variations in bodily health, and may then conceivably help to cause headache. Indeed, Lauder Brunton claims to have detected heightened intra-ocular tension in some headaches. He thinks that the frontal headaches which occur in indigestion and biliousness are frequently due to it.³ It does not seem probable that such increase of tension has anything to do with the headache of eye-strain, for atropine, which increases tension, sometimes temporarily relieves it (Hewetson, Savage), evidently by paralysing accommodation; and on the other hand, eserine, which diminishes tension, may afford similar relief (Stevens), and probably in the same way.

3. *Eye-strain*.—This term refers essentially to strain of the muscles of accommodation and fixation, although, as we shall see, other factors are involved in the condition. It results from

¹ Cotin writes : " Headache is observed in a large number of diseases of the Eye " (" De la Céphalalgie," p. 14, Paris, 1847).

² See a paper by John Tweedy in the *Practitioner*, 1883, vol. xxxi., p. 321.

³ " Disorders of Digestion," London, 1886, p. 106.

the employment of the eyes for near objects requiring accurate focussing and fixation. If the eyes are normal both as regards refractive media and muscles, the individual will be able to do close work for long periods without experiencing any discomfort, though even then excessive application may cause fatigue. If, on the other hand, there is some error of refraction, such as hypermetropia, which throws undue work upon the ciliary muscle; or if the extrinsic muscles be in some way defective, one or other of them being too long, too short, or too strong, so that extra effort is necessary for proper fixation; or, finally, if the ocular muscles, intrinsic or extrinsic, be wanting in vigour—then close application of the eyes, as in fine needlework, reading small print, or using the microscope, is very apt to result in eye-strain.

That muscular fatigue is the essential element in this condition there can be little doubt. Let any one excessively converge the eyeballs so as artificially to induce squint, or let him direct the eyes to the extreme right or left for a short time, and he will prove for himself that the extrinsic muscles may be strained. Donders attributes the sense of fatigue felt in the eye after close application to the accumulation of waste products in the ocular muscles. It is important to note, however, that not the muscles only, but the entire orbital contents and the eyelids also are apt to be affected in eye-strain, as is shown by the tendency in those who suffer from it to swollen lids, tenderness of the globes, catarrh, tinea tarsi, and even to phlyctenular ophthalmia. We must therefore regard the eye as very profoundly affected dynamically, and undoubtedly it is these local effects which are chiefly instrumental in producing those remoter consequences of eye-strain which will be presently considered, though it is possible that a more purely nervous factor is also at work in their production. Thus: "The accommodation of the eyes," writes Liveing, "for distinct and harmonious vision is a very nice piece of consensual mechanism; . . . it has been often observed that the attempt to accomplish a nicely adjusted act . . . has been followed in persons of nervous constitution by a *serious disturbance of the sensorium*."¹ Again, Stevens, writing of the eye-strain of hypermetropia,

¹ "On Megrim," &c., Lond. 1873, p. 265.

observes, "No sooner is one part of the adjustment corrected than the other is wrong. It is to *this nervous perplexity*, more than to the actual strain of muscle, that the weariness and pain characteristic of hypermetropia are due."¹ And I would add that some of the effects (*e.g.*, mental confusion) may be due to the blurred and sometimes double image resulting from imperfect accommodation and fixation.

While, then, we cannot speak with absolute certainty as to the exact share taken in the production of eye-strain and its effects by the dynamical changes in the eyes and by "nervous perplexity" respectively, this much is certain—the strain is, directly or indirectly, the result of the acts of focussing and fixation.

The symptoms of eye-strain are, briefly, confusion of vision, discomfort, fatigue, and, it may be, tenderness in the globes. To these may be added headache and a number of more remote sequences which till recently were not known to be in any way connected with the eyes. The condition was recognised by Jüngken (1836), who termed it *hebetudo visus*, by Tyrrel, (1840), Lawrence (1841), and Mackenzie (1843), and is referred to by Donders (1864) in his great work.² It was first ascribed to some defect in the retina and the optic nerve, patients being told to desist from close work in order to check what was thought to be the oncoming of blindness. Gradually, however, the muscles of the eye came to be suspected, first the external muscles, and finally—when Donders made his discovery of hypermetropia—the internal.

Of the symptoms mentioned, frontal headache is to us the most important. A good deal has been written recently on the subject of headache from eye-strain, as though the relation of the one to the other were a quite new discovery, yet it is nothing of the kind, for headache so arising is mentioned by each of the writers just quoted. It was also recognised by Vaughan, who wrote:—"They whose occupation requires the continual exercise of their eyes on minute objects, and they who fatigue their eyes by poring over a book, printed in a small type, more especially in a dim light, are frequently

¹ "Functional Nervous Disorders," G. T. Stevens, 1887, p. 30.

² "The Anomalies of Accommodation," New. Syd. Soc., Lond. 1864, p. 269.

affected with headache.”¹ Similarly, Jüngken, after enumerating certain symptoms referable to the eyes, continues, “zuletzt gesellt sich ein drückender Kopfschmerz in der Stirn dazu,”² and Lawrence, writing on the same subject, alludes in almost identical language to the painful pressure which is felt on the brow. Mackenzie also mentions among the symptoms “a sensation of weight in the head, and pains in the globes, the orbits, temples, and forehead,” while earlier still than any of these, William Kitchner observed of people who, requiring glasses, neglect to use them: “Their eyes ache, their head aches, and every bit of ’em aches.”³ Piorry (1835) was the first to draw attention to the connection between eye-strain and megrim. He cites the cases of a physician in whom attacks of megrim were induced by reading closely written notes, and of two young women who brought them on by sitting up late at night.⁴ Henoch (1859) mentions undue irritation of the eyes as a cause of megrim, but it is not quite clear whether he included eye-strain among the forms of irritation,⁵ and it was not till 1870 that the same connection was again clearly pointed out, this time by Airy, who observed it in his own person.⁶ He was followed by Anstie,⁷ who, in the same year, insisted upon the important part played by functional abuse of the eyes in the causation of neuralgia. Not long after we find Liveing dwelling upon the influence of eye-strain in precipitating an attack of megrim.

It can, however, scarcely be said that the connection between eye-strain and nervous disturbances, headache included, was properly appreciated till 1874. In this year Brudenell Carter read before the Clinical Society his classical illustration of it.⁸

¹ Vaughan, “Essay on Headachs,” Lond. 1825, p. 129.

² “Die Lehre von den Augenkrankheiten,” Berlin, 1836, p. 815.

³ I give this on the authority of G. T. Stevens (“Functional Nervous Diseases,” New York, 1887, p. 6). The same writer declares that Maître-Jan (“Traité des Maladies de l’Œil,” 1707, p. 260) gives a good description of eye-strain, but on looking up the reference I find what I think there can be little doubt is a description of glaucoma.

⁴ Mémoire, &c., “Du Procédé Opératoire,” quoted by Liveing, *op. cit.*, p. 54.

⁵ *Deutsche Klinik*, April 2, 1859.

⁶ *Phil. Trans.*, 1870, p. 259. Close reading and writing induced teichopsiæ.

⁷ “Neuralgia and its Counterfeits,” p. 133.

⁸ The case was that of an Oxford undergraduate who suffered from intense

Weir Mitchell and G. T. Stevens, in America, shortly after directed their attention to the same subject, and to these three more than to any others we owe it that the connection is now clearly recognised. Weir Mitchell's observations are set forth in a paper written in 1876;¹ while Stevens' writings extend from 1876 to the present time. His views are summarised in a work published in 1887,² in which he seeks to show that not only headache, but neuralgia, chorea, epilepsy, and even insanity, are intimately associated with errors of accommodation and fixation. To him belongs the credit not only of exploring this field of research more widely than any other writer, but of having shown the influence which imperfections of the *muscles of fixation* play in the development of nervous manifestations.

Within the last few years a number of other writings have appeared on the same subject.³

headache, sickness, vertigo, and palpitation. He was thought to be the victim of some obscure form of organic disease of the brain, and he was advised to take a voyage to Australia. It was found, however, that all these symptoms arose from a high degree of myopia, for they were entirely removed by providing the patient with appropriate glasses.

¹ *The American Journal of the Medical Sciences*, 1876, vol. lxxi., p. 367. The author, after describing a case reminding one of Carter's, comments on it thus: "Who, indeed, could have supposed that a mere ocular defect could have given rise to so serious a train of evils—beginning with headache and ending in an unconquerable anæmia—and who that had not seen it could believe that the correction by glasses of the eye-trouble could have given a relief so speedy and so perfect that she herself described it as a miracle?" In connection with this case the following remarks of Hughlings Jackson may be quoted: "I could relate cases of hypermetropia in which the diagnosis of brain disease had been made by physicians and refuted by ophthalmic surgeons," and he proceeds to cite a case similar to Brudenell Carter's (*Lancet*, 1877, vol. i. p. 675).

² "Functional Nervous Diseases," New York, 1887.

³ See, for instance:

1878. Brailey, *Guy's Hospital Reports*, p. 1.

1880. *Brit. Med. Jour.*, June 19, 1880, p. 936.

1882. Savage, *Brit. Med. Jour.*, vol. ii., p. 909; Cordes, *ibid.* p. 1129; H. B.

„ Hewetson, *ibid.* p. 1206.

1883. C. Higgins, *Brit. Med. Jour.*, 1883, vol. i.; Myles, pp. 237, 1115.

1884. Musso, "Allo studio della cefalea oftalmica," Morgagni, Nos. 11 and 12.

„ Bianchi, "Cefalea oftalmica, Lo Sperimentale," Feb.

„ Martin, "La Migraine," *Soc. fran. d'Ophth.*, Jan. 31.

„ Rusconi, "La Cefalea Ottalmica," *Gazz. d'Ospit.* No. 27.

1885. H. B. Hewetson, *Med. Times and Gaz.*, vol. i., p. 375; leading article, *Lancet*, vol. i., p. 1091.

We have seen that eye-strain occurs in connection with the acts of accommodation and fixation. Let us now consider each of these separately.

1. *Eye-strain occurring in Connection with Focussing.*—This may result from—*a*, errors of refraction; *b*, weakness of the ciliary muscle.

a. Of refractive errors hypermetropia is the commonest cause of eye-strain, and most writers on the subject regard it as more productive of ocular headache than myopia or astigmatism. In this condition increased work is put on the ciliary muscle, and this tends to cause exhaustion of the muscle and other dynamical changes in the eye. Sometimes the excessive ciliary contraction leads to spasm and temporary myopia, a fertile source of headache, according to Jessop, especially in the young.

Next to hypermetropia, we may place astigmatism, which is probably the more effective cause of the two, but the less common because of its less frequent occurrence. No refractive error is so apt to produce megrim as this (Hewetson and others). According to Marlow, compound hypermetropic astigmatism is of all refractive errors the most productive of headache.

As to the mode in which the eye-strain is produced in

- 1886. T. L. Brunton, "Disorders of Digestion," Lond. pp. 76, 77.
- „ C. F. Sinclair, *Chicago Med. Jour.*, etc., Nov.
- „ A. L. Ranney, *New York Med. Jour.*, vol. i. p. 229.
- „ T. Featherstonhaugh, *Am. Jour. of Ophthalm.*, p. 327.
- 1887. T. H. Bickerton, *Lancet*, vol. ii., p. 303.
- „ C. Higgins, *Brit. Med. Jour.*, vol. i., p. 104.
- „ H. Parinaud, *Centralblatt für Augenheilkunde*, p. 475.
- „ R. W. Amidon, *Boston Med. and Surg. Jour.*, vol. ii., p. 497.
- „ G. S. Norton, *Centralblatt für Augenheilkunde*, p. 336.
- „ Angel Money, "Treatment of Disease in Children," Lond., p. 397.
- 1888. *Lancet*, vol. i., p. 1043.
- „ W. H. Jessop, *Practitioner*, Oct., p. 274.
- 1889. Dr. Gould (Philadelphia), *Lancet*, 1889, vol. i., p. 801.
- „ M. Standish, *Trans. Am. Ophth. Soc.*, vol. v., p. 386.
- „ Culver, *Am. Jour. of Ophth.*, vol. vi., p. 187.
- „ F. W. Marlow (New York), *Ophth. Review*, Lond., p. 353.
- 1890. P. Peake, *Lancet*, vol. ii., p. 666.
- 1892. Ellis, *New York Med. Jour.*, April 30.
- 1892. Ernest Clarke, "Eye-strain," Lond., pp. 9-23.

astigmatism: if it be hypermetropic, the ciliary muscle has necessarily extra work to do, but in all forms of astigmatism—hypermetropic, myopic, or mixed—the important factor in the production of strain would appear to be the continual alteration of accommodation which has to take place in order that first one meridian of an object, and then another, may be brought into focus. If, let us say, the vertical aspect be correctly focussed, the horizontal, being out of focus, will appear dim, and to remedy this the focus has to be altered, and this constant accommodation and re-accommodation is not only very fatiguing to the ciliary muscle, but bewildering to the mind. As in the hypermetropic, so in the astigmatic eye, ciliary spasm is apt to be induced, and in this wise: the astigmatic eye benefits by a small pupil, but contraction of the ciliary muscle and pupil being co-ordinated in accommodation, the one is liable to produce the other. In consequence of this spasm the myopia in myopic astigmatism may be temporarily increased, while hypermetropic astigmatism may be rendered myopic (Brailey). Ciliary spasm, it should be observed, may involve part only of the muscle and may thus cause temporary astigmatism, or it may cure a corneal astigmatism (Jessop).

Myopia, unlike hypermetropia and astigmatism, does not lead to fatigue of the ciliary muscle; nevertheless, it may cause eye-strain and headache (perhaps in part on account of the extra work put upon the adductors).

Unequal refractive power in the two eyes (anisometropia) is also a cause of headache.¹

b. Weakness of the ciliary muscle is of at least three kinds, and each kind may cause ocular headache. The first manifests itself as paralysis—diphtheritic, for instance—which is given by Jessop as a cause of headache. The second form is presbyopia. The power of accommodation diminishes with advancing years, partly from increasing weakness in the ciliary muscle, and partly, or according to some, solely, from increasing rigidity

¹ Angel Money has observed that headaches are more prone to occur in those with refractive errors than in emmetropes, even when other causes of headache are at work, such as typhoid and indigestion ("Treatment of Disease in Children," 1887, p. 397).

in the lens, till by the age of sixty-five it has entirely disappeared. This diminishing power of accommodation necessarily increases the tendency to eye-strain. Accordingly, we often find ocular headache first manifesting itself simultaneously with presbyopia; I have seen several instances of its occurrence at about the age of forty. The third variety of ciliary weakness is a most important one; it may be called simply loss of tone, and is shared by the extrinsic muscles of the eye also. It is apt to occur in all debilitated states of the body; thus it is observed in anæmia, in the convalescence from acute disorders, and in the puerperal state, but it is perhaps most strikingly manifested in the condition known as neurasthenia, and though headache is common in these conditions quite independently of the eyes, yet frequently it is this loss of tone which is the chief, and sometimes the sole cause, as is shown by its disappearing, as Jessop remarks, when the muscles have been braced up by tonic treatment. This writer has pointed out the prevalence of ocular headache among medical students, and he rightly asserts that it is in large measure due to loss of muscular tone resulting from the sedentary and artificial life which they lead and which stands in sharp contrast to the school life they have but just left behind them. I have over and over again observed headaches of this kind disappear with tonic treatment. Sometimes the weakness is of very brief duration, tone being rapidly restored. Thus it not infrequently happens that a man jaded with a long day's work finds himself unable to read with any comfort, but after he is refreshed by dinner the strength of the ciliary muscle returns with that of the rest of the body, and reading becomes once more quite easy.

We now know that much so-called "exhaustion" is not exhaustion at all in the strict sense of the word, but rather paralysis from blood-poisoning. A man may have noticed for some days that he easily tires, and that reading soon fatigues. While in this condition let us suppose him to bring on an acute attack of dyspepsia by some indiscretion in diet; there is vomiting and diarrhoea, and all appetite disappears. In consequence he takes little or no nutriment for two or three days, but meantime the tendency to exhaustion, instead of

increasing, diminishes, so that at the end of his term of starvation he finds himself far more "fit," physically and mentally, than at the beginning; he can now read comfortably for two or three hours, while before, a few minutes fatigued him. We can only explain these cases on one supposition; that the tissues in the first instance were not starved (for if so, how could they improve on starvation diet?), but poisoned. I am convinced that it is most important to bear this fact in mind in the case of eye-strain and headache resulting from it. "Many a patient," writes Ernest Clarke, "may be cured of asthenopia by simply correcting some trouble of the stomach, liver, or bowels."¹

It need scarcely be said that loss of tone in the ciliary muscle works for ill with heightened effect when associated with error of refraction. A degree of ciliary weakness which in an emmetropic eye might cause little discomfort, would in the hypermetropic very soon lead to eye-strain, and indeed it not infrequently happens that a debilitated state of the body, by affecting the ciliary muscle, reveals a latent hypermetropia or astigmatism (much in the same way as it may disclose a latent valvular lesion of the heart), the muscle which in its normal state of vigour has been able to compensate for the defective refraction, being unable to do so when weakened by disease.²

2. *Eye-strain occurring in Connection with Fixation.*—When an object is "fixed," the eyes are turned towards it in such wise that a line drawn from it through the centre of either eye to the fundus, strikes upon the yellow spot: the image falls upon corresponding parts of each retina and single vision results.

Fixation is effected by means of the external muscles of the globe. These muscles must, for obvious reasons, act co-ordinately with the intra-ocular muscles; consequently any interference with the proper action of the one tends to disturb that

¹ "Eye-strain," Lond., p. 50.

² Weir Mitchell, after remarking upon the fact that many may endure for years astigmatism without any accommodative troubles, observes "but with increase of years their powers fail, and they begin to feel the added exertion now needed in some shape—either in eye or head, or in both" (*Am. Jour. of the Med. Sciences*, 1876, vol. lxxi., p. 371).

of the other. In hypermetropia, for instance, the excess of ciliary contraction is apt to lead to undue adduction, so that fixation is imperfect. It is indeed possible that the difficulty of adjusting the action of the ciliary to that of the adductor muscles in hypermetropia is one of the causes of eye-strain in it. The same sort of difficulty is observed in an individual who wears convex glasses of sufficient strength to enable him to see near objects distinctly without accommodation. He is required, while keeping his ciliary muscle lax, to converge as usual, but this dissociation of adduction from ciliary contraction being a new experience, it can only be effected with great difficulty, if at all. That the unpleasant symptoms which occur in such a case are due to the effort which the dissociation requires, is shown by the fact that they at once vanish if one eye be closed, so that convergence is unnecessary.

When the eyes and their muscles are perfectly normal, fixation is effected without any effort. Difficulties in fixation may arise sympathetically with some error of accommodation, as in the case already mentioned, or from some fault in the muscles of fixation themselves. It is of the latter we have now more particularly to speak, constituting as they do an effective cause of headache.

The error in the extrinsic muscles may be so great that fixation is not attempted, being impossible (=strabismus), and consequently no secondary evils, such as headache, result. When, however, the error is slighter, fixation is possible *with an effort*, and secondary troubles, headache amongst them, may be induced by the strain which that effort involves.

The most common defect of the extrinsic muscles is "*inefficiency*"¹ of the interni." It was first pointed out by Von Graefe, and is the only one alluded to in the text-books, but as Stevens has shown, the abductors and the muscles which elevate and depress the globe may be similarly inadequate. The terms Stevens uses to denote these various deficiencies are so convenient that I shall employ them here. When an individual looks at the horizon, the visual axes should be parallel;

¹ I venture to substitute this term for "insufficiency" which is indifferent English. "Inadequacy" is, perhaps, a still better term.

this is *orthophoria*. When they are not parallel, there is *heterophoria*. Of this there are three main varieties: *esophoria*, a tendency of one or other of the visual axes inwards; *exophoria*, a tendency of the same outwards; *hyperphoria*, a tendency of the same upwards.¹

¹ The mode of testing for these several conditions is as follows: The patient—who, if not ametropic, must be rendered so with lenses—must look straight at an object (the best being a lighted candle against a dark background) situated at a distance of at least 20 feet, and on a level with his eyes. The visual axes should then be parallel (practically). Let the following principle be kept in mind: *By placing a prism before one eye, the mental image obtained through that eye is moved in the direction of the apex of the prism.* If, therefore, a prism be placed before the right eye with the apex upwards, the image belonging to this eye will be moved upwards. Suppose the images to be in the same vertical line; there is neither eso- nor exophoria. Suppose the image belonging to the right eye to be to the right of the other image; there is esophoria. Suppose it to appear to the left; there is exophoria. (It will at once be seen that the rolling of the eye in any direction turns the image in the opposite direction). Let now the apex point outwards; the image will move in the same direction. Suppose the two images to be horizontal; this is normal. Suppose the image belonging to the right eye is higher than its fellow, the right visual axis will be lower than the left—there is left hyperphoria, the displacement being manifestly due to the rolling downwards of the right eye, or rolling upwards of the left. Maddox (*Ophthal. Review*, vol. ix., p. 129) has devised an instrument for detecting heterophoria in accordance with these principles.

In testing for hyperphoria, it is generally best not to attempt a correction of any ametropia that may be present.

For reading-distances Graefe's method may be employed.

The strength of the different pairs of muscles may be ascertained by finding what prism they are respectively capable of overcoming so that single vision shall result. The abductors should be able to overcome 8°. Thus a prism of this strength placed with its apex outwards before either eye will tend to move the image of the right eye to the right, that of the left eye to the left, while the abducting muscles, by turning the eyes outwards, tend to move the images inwards. The adductors should be able to overcome 50°. If a prism of this strength be placed with the apex inwards, the image in each eye tends to cross the other, but this may be corrected by powerfully rolling the eyes inwards. The muscles which roll the eye upward and downward should be capable of overcoming 3°. (In my opinion they may be much stronger.) For this test the prism is of course placed with its apex up or down. It is always advisable to examine the strength of the several pairs of muscles in this way, so as to correct any possible error in the conclusion arrived at by the tests already mentioned, for it must not be forgotten that they fail to indicate with absolute accuracy the degree of heterophoria present. Mere strength does not, however, imply efficiency. We may, for instance, get good adducting power, and yet, if the external recti predominate, there will be exophoria.

Heterophoria, especially in its most frequent form of exophoria, is as potent a cause of headache as ametropia; indeed, Marlow contends, more so. Exophoria is generally due to inefficiency of the adductors, and only in rare cases to excessive action of the abductors.¹ The inefficiency may be equal on both sides, or more on one side than the other. It should be noticed that the adductors are used more than any other extrinsic muscles in fixing for near objects, greater force being needed for convergence than for any other movement of the eyes, and accordingly they are the most powerful. It is not therefore surprising that any weakness in them should lead to marked fatigue in fixing near objects for any length of time. The strain is said to be felt chiefly on the inner side of the eye (Parinaud). Esophoria, due either to inefficiency of the abductors or to preponderance of the adductors, is less common than the last-named condition, though quite as powerful to cause headache. More powerful than either, according to some, is hyperphoria. The muscles which rotate the eye on its transverse axis are considerably weaker than the adductors or abductors; consequently great difficulty is experienced in correcting any tendency for one visual axis to rise above the other, and the strain is correspondingly great. It is probable that a combination of this condition with hypermetropic astigmatism is, of all optical defects, the most potent in producing headache (Marlow). English writers, however, attach little importance to hyperphoria as a factor in eye-strain.

All the remarks on loss of tone of the ciliary muscles apply also to the extrinsic ocular muscles. Difficulties of fixation always tend to be increased by anything which lowers the general health.

In considering the several muscular affections of the eye, it is most important to bear in mind that they may be in large

¹ A muscle of fixation may be *absolutely* or *relatively* inefficient. Absolute inefficiency may be due to some defect on the part of the muscle itself, which may be too weak, or so attached to the globe as to work at a disadvantage, or defectively innervated. Relative inefficiency, on the other hand, is due to the over-action of an opposing muscle which may be too strong, or so attached to the globe as to work at an advantage, or excessively energised.

It therefore follows that a muscle may have considerable power, and yet be inefficient.

degree functional, and not necessarily organic, either wholly or even in part—not necessarily due, that is to say, to some muscle being too long, or too short, or otherwise defective. The general health, as we have seen, exerts a profound influence on the condition of the ocular muscles, and it has further been shown that they may be reflexly affected by disorders of other organs, as of the nose and teeth. Especially of late has attention been drawn to the influence of nasal disease, more particularly of rhinitis and nasal polypi, in causing various disorders of the eyes—asthenopia among others—their real connection being shown by the fact that they resist direct treatment of the eyes, but yield to treatment directed to the nasal mucous membrane. These facts, it need hardly be said, should be borne in mind in considering the advisability of operating on the extrinsic ocular muscles.¹

The part played by eye-strain in exciting neuroses is greater now than formerly, and is likely to become still greater. For, in the first place, the eyes are more used in close work in this than in any previous age. Primitive man had seldom occasion to keep his ciliary muscles and adductors in active contraction for hours together; but with the advance of civilisation and the spread of education to the masses, processes involving eye-strain are vastly increased, and will continue to increase. In the second place, the eye is a wonderful piece of mechanism, and can only be kept at a high level of efficiency by a severe process of selection. In the primitive stage of man, an adult myope was a practical impossibility, as among wild animals, for such a one would have been unable to protect himself against a stealthily advancing foe, and the like is true of any other marked defect in accommodation or fixation; but no weeding-out now takes place, and unless individuals presenting ocular defects come to regard themselves as unfit to propagate the

¹ Gruening states that he has, by attention to the nose, relieved 150 cases of eye disease in which direct treatment of the eyes was unsuccessful. Cheatham also (*Am. Pract.*, April 2, 1887), has cured eye mischief, including hyperopia and presbyopia, by attacking the nasal mucous membrane, and A. Trousseau reported at a meeting of La Soc. d'Ophthalmologie, April 21, 1889, a case of nasal asthenopia which yielded to treatment of the pituitary membrane but to no other.

race—a consummation to be wished perhaps, but scarcely to be expected—their number must necessarily increase.¹

We have now considered the various conditions of the eye calculated to induce eye-strain, and therefore to initiate headache. In all cases of chronic or constantly recurring headaches the possibility of such causes being at work must be borne in mind, and examination of the eyes should be made both as to refraction and the state of the muscles, intrinsic and extrinsic. The sufferer from ocular headache is often quite unaware of any relation between his ocular defect and his headache. From which it follows that we must not be content with his own statements in regard to his eyes, but must make careful examination for ourselves. Sometimes it will be found that he suffers from eye-strain after close application, but though in some instances he may recall the fact that headache is apt to occur with it, he does not recognise any causal relation between the two. Again, a patient may have headache as a reflex effect of some marked defect in refraction or in the system of ocular muscles, and yet he may not complain of eye-strain. Weir Mitchell draws especial attention to these cases, and I have frequently observed them myself.

Nature and Situation of the Headache of Eye-strain.—Headache resulting from eye-strain has no special characters by which it may be diagnosed from headache otherwise induced. It includes every variety of pain, and may be situated in

¹ I do not overlook the fact that natural selection does not cease when an organism is perfectly adapted to its environment—when it has, in fact, attained structural perfection. Owing to the constant occurrence of variations, organisms are continually being produced which fall short of perfection in one or more particulars, and in order to maintain a race at a high level of organisation, these imperfect types must be continually weeded out. This process has been termed by Weismann *Panmixia*, but it is, needless to say, greatly interfered with in the case of civilised man. Moreover, as a matter of fact, the human eye has never reached perfection, seeing that in the most perfect eye some chromatic and spherical aberration is present; and it is very probable that hypermetropia and astigmatism are not altogether absent among the uncivilised. Be this as it may, the interference with the action of panmixia among the civilised, in respect of the eyes, is certain to lead to more serious degradation of these organs than one likes to contemplate.

any part of the head. At one time it is a classic type of megrim, at another a supra-orbital neuralgia. That it may be megrinous, Piorry, Airy, and Liveing have recognised, and recently quite a host of observers have come forward to emphasise the fact. Thus Ranney writes: "I have yet to meet a typical case of megrim in which a marked error of refraction, or a serious muscular anomaly in the orbit, does not exist." Stevens, who is equally emphatic, quotes a large percentage of cures which he has obtained by correcting optical defects. Hewetson also alludes to the frequency of astigmatism among the megrinous, and he asserts that by correcting this and other errors of refraction, not only may the sick headache be removed, but also the dyspepsia which occurs between the attacks of headache. I regret to say that the percentage of cures among my patients has been considerably less than among Stevens'; I have seen good results from correcting the astigmatism, but I have unfortunately often been disappointed.

The most common situations for ocular headache are the forehead and the temples, and I have already attempted to explain why these parts should suffer chiefly in headaches due to irritation of the ophthalmic area. They are generally bilateral and of equal intensity on both sides. If more intense on one side than the other, it is usually on the side of greatest optical defect. This also is the affected side when the pain is unilateral. Jessop has noticed neuralgia of the supra-orbital, supra-trochlear, nasal, lachrymal, and, less frequently, of the infra-orbital branches of the fifth.

Headache in connection with eye-strain may also be either vertical or occipital, but writers are not agreed as to which is the more common. According to Culver and Dana the pain resulting from errors of refraction is generally frontal, while that occurring in consequence of muscular errors is more commonly occipital. Amidon is still more specific in his statement, maintaining that inefficiency of the internal recti—not of any others—is apt to lead to sensory disturbances, *e.g.*, a sense of heavy pressure in the occiput, nucha, shoulders, and back. I have not observed this. Weir Mitchell and Hewetson allude to the occurrence of occipital headache in eye-strain.

I am inclined to think that when ocular headache attacks either vertex or occiput, it is because there is some special predisposition to headache in these parts, a predisposition which would display itself under other exciting causes. Thus in debilitated states of the nervous system there is always proneness to vertical headache, and eye-strain might very well excite it. Again, there are some who have a special proclivity to occipital headache, scarcely ever suffering ache in other parts of the head; and the same remarks apply to them. In short, as Ernest Clarke observes, "the position varies with the individual."¹

It is important to observe that the same individual may suffer from several different varieties of headache; one of Jessop's patients suffered from no less than four, as well as from neuralgia. (Only two of these were relieved by glasses.)

Ernest Clarke lays stress on the fact "that the headache of eye-strain is very often *periodic*. It does not follow that when the headache occurs it necessarily implies the presence of greater eye-fatigue; the amount of strain may be the same as when no headache occurred, but the individual is in a different condition."²

The Academy Headache.—In connection with ocular headache we may again briefly notice that form which results from sight-seeing, and which attacks frequenters of museums, picture galleries, exhibitions, etc. Perhaps the most aggravated variety of it is that to which Ruskin some time ago drew attention, and which has since been known as the "Academy Headache." The causes tending to produce it are very much the same in one kind of sight-seeing as in another; in the case of the annual exhibition of pictures at the Royal Academy they are the warm and vitiated air of the crowded rooms, the glare of the brightly coloured pictures intensified by the sunlight entering through the skylights, the perpetual rotation and extension of the head, and the rolling upward of the eyes. A writer in the *Lancet*³ lays great stress upon the muscular strain entailed by these movements, strain on the muscles which extend and rotate the head, and on the extensor

¹ "Eye-strain," Lond. 1892, p. 11. ² *Ibid.* ³ *Lancet*, 1888, vol. i. p. 1043.

muscles of the eye. Léon Colin also alludes to the strain on those which are almost continuously engaged in directing the movements and maintaining the equilibrium of the head,¹ and which alone have no rest during sedentary occupations.² A further element in the causation of this headache is the perpetual shifting of the eye from one object to another: the mere act of moving the eye over a brilliantly coloured surface is highly fatiguing. We have also to take into consideration the maintenance for a long time of the upright posture. Standing and slow walking are notoriously much more fatiguing than brisk walking, probably because the circulation tends to get languid under these circumstances so that the tissues are poorly supplied with blood,³ and that this fatigue helps to cause the headache is proved by the effect of a short rest. Unfortunately, opportunity for sitting is but scant at the Academy.

The influence of retinal irritation and eye-strain in the production of headache is well shown by reference to the blind. Among blind persons who are in other respects healthy, headache is, I believe, less common than in the average individual who uses his eyes in near work. Furthermore, among the former we do not find the same preponderance of pain in the frontal regions as in the latter.

I am indebted to Dr. J. F. Campbell, of the Royal Normal School for the Blind, Norwood, for the opportunity of investigating this question among the pupils of his institution. My observations were made on thirty-eight young women and twelve young men. These were divided into the completely and the partially blind—the latter possessing sufficient sight to find their way about, but unable to use their eyes for near work, and hence not subjected to eye-strain of any kind. Ten

¹ Dict. Encycl. des Sciences Méd., Paris, 1873 (art., Céphalalgie.)

² He contends that they play a considerable part in the causation of cephalalgia. Thus he explains the greater frequency of headache among women of sedentary life than among men.

³ See *Lancet*, 1885, vol. i., p. 1091. The reader may also consult *Brit. Med. Jour.*, 1880, vol. i., p. 936.

of the women and six of the men were totally blind. The following are notes upon these :

WOMEN.

1. Headache occasionally ; generally at occiput, sometimes at vertex, practically never at the forehead.
2. Does not know what it is to have a bad headache ; occasionally slight frontal headache.
3. Seldom has headache ; occasionally in the supra-frontal region.
4. Scarcely ever has headache ; so seldom, cannot say where it is.
5. Sometimes has frontal headache.
6. Rarely has headache ; if any, on vertex.
7. Seldom has headache ; occasionally on the crown or at the side of the head.
8. Rarely has headache ; if any, frontal.
9. Head never aches.
10. Seldom has headache ; if any, frontal.

MEN.

1. Rarely has headache ; sometimes the upper part of the right parietal bone aches.
2. Head scarcely ever aches ; occasionally has pain just below the occipital protuberance or behind the ears.
3. Sometimes has occipital headache.
4. Occasionally has beating in the back part of the crown.
5. Head very seldom aches ; when it does, in supra-frontal region.
6. Is liable to headache when overpressed with work ; it is felt in the depth of the brain.

It will be observed that very few of these young people were liable to headache, and in regard to the situation of the pain, I do not think that, taking all the cases together, they show that preponderance of frontal pain met with in those who can see plainly. Moreover, among those in whom the pain was frontal, some had once had their sight, and the frontal pain might possibly be in part a legacy, so to speak, of the time when the potentiality of optic irritation was present. I think it will probably be found that among those born completely

blind, pain is not more liable to attack the forehead than other parts of the head.

Among those who could see a little, headache was more common than among the completely blind, though I think less common than among those who can see plainly. There was, however, a decided preponderance of frontal pain over pain in other regions. It is true that in the partially blind the irritation of eye-strain is altogether absent, but on the other hand, it is not improbable that in some of these cases there is optic irritation of some kind to account for the preponderance.

One case showed the connection between irritation of the optic area and headache in a remarkable manner. It was that of a man who, quite blind in the right eye but seeing indistinctly with the left, was liable to headache over the fore part of the left vertex.

Another interesting case was that of a young woman, twenty-two years old, who could see just enough to get about. She was liable to frequent attacks of sick headache which incapacitated her from work. This case effectually disproves the contention that all cases of megrim are due to eye-strain.

Some of the totally blind complained of headache in the sides of the head, and this variety was noticed among the partially blind. Whether parietal headache is unusually common among the blind (totally or partially) I will not be certain, but it struck me it was from the cases I examined, and in seeking a reason why it should be, it seemed to me possible that it is because the blind use their ears more than those who can see. I am not aware that we can speak of ear-strain as well as of eye-strain, though I should not be surprised if such were the case, seeing that the ear, like the eye, is provided with muscles, and if the one set may be overworked—strained—why not the other? Be this as it may, one blind man complained that “tuning” was very apt to give him headache. I have elsewhere argued that the nerves over the sides of the head in the neighbourhood of the ears bear the same relation to the ears and to hearing, as

the nerves in the front of the head do to the eyes and to sight.

It may be of interest to mention here the causes which the blind women assigned for their headaches. Excitement and worry seemed to be the chief; but sudden exertion and fatigue were also given, one patient complaining of a pain on the crown when she got tired.

NOTE.—While correcting the proofs of this work my attention has been drawn to Dr. Head's valuable paper on "Disturbances of Sensation" etc., published in *Brain* (Parts I. and II., 1893). By carefully mapping out the areas of cutaneous tenderness which so frequently accompany visceral disease, and by noticing the exact distribution of herpetic eruptions, Dr. Head has been able to divide the grey matter of the cord below the level of the first dorsal pair of nerves into a series of segments, each of which sends trophic nerves and nerves subserving the sensations of pain, heat, and cold (not touch), to a definite cutaneous area, and some of which send also trophic nerves and nerves subserving the sensation of pain to viscera. When therefore a viscus is irritated, a disturbance is set up in its appropriate segment, and hence sensory and trophic disturbances may occur in the cutaneous area belonging to this segment.

So far as Dr. Head's present published conclusions are concerned, they point to the existence of twelve dorsal and five sacral segments, a consideration of the segments in the cervical cord and base of the brain being reserved for a future paper. Having for a number of years past made drawings of all the cases of herpes that have come before me, it occurred to me that, working upon his hypothesis, a reference to these might possibly throw some light upon the fact that optic irritation has a greater tendency to produce pain in the suprather than in the infra-orbital region for the nerves of the eyeball and forehead might belong to one segment of grey matter and those of the infra-orbital region to another and lower segment. I soon came across a drawing suggesting that this might actually be the case. It was that of a child, fourteen months old, with a herpetic eruption involving the whole of the right temple, the right half of the forehead, the anterior crown, the right upper lid, and the right half of the bridge of the nose, all of which parts are frequently involved together in headache. A second sketch, that of a boy, aged sixteen, shows practically the same distribution. Another, however, of a man aged twenty-two, shows most of the skin between the eyebrow (on the left side) and the palpebral fissure to be thickly studded with the eruption (the upper and inner part wholly escaping), which also extends for some distance below the palpebral fissure, and implicates the nose, but not that part involved in the first case.

The fact that the upper lid was involved in both these cases tends to show that the two areas overlap, and cannot therefore belong to separate segments of grey matter.

CHAPTER X.

DISORDERS OF THE NOSE AND ITS ACCESSORY CHAMBERS, RETRO-NASAL SPACES, AND PHARYNX.

THE sympathy between the nose and other parts was known to the ancient Greeks.¹ In Plato's Symposium, for instance, it is pointed out that hiccough may be cured by tickling the nose, and Hippocrates observes that sneezing produces the same effect. The habit of applying remedies to the nose for various affections of the head was very fashionable among the Greek and Roman physicians, who not only treated headache by drawing blood from the nose, but by the employment of all sorts of nasal ointments and lotions,² modes of treatment which must in part have been founded upon their belief in an intimate connection between states of the nose and pain in the head. The influence of certain odours in causing headache is alluded to by Paulus and by Pliny; and Montalto³ quotes Rhases to the effect that persons endowed with a very delicate sense of smell are very liable to headache, while Fernelius points out the connection between hemicrania and catarrh.

¹ See J. N. Mackenzie's historical account of Reflex Nasal Neuroses in "Annales des Maladies de l'Oreille," vol. xiii., p. 457. The writer there shows that much of what has recently been written on this subject has been known from the earliest period of medicine, in proof of which he gives numerous quotations. So far as headache is concerned, my reading had afforded abundant evidence that such was the case, before I read Mackenzie's article. Some of the authorities I had consulted are referred to by this writer, others are not. I have therefore only thought it necessary to give the references in the latter case, since Mackenzie's careful paper is accessible to all.

² See Paulus Ægineta, *op. cit.*, p. 356.

³ *Opus cit.*, p. 65.

A reference to Wepfer's elaborate work on affections of the head will make it very evident that the knowledge of the connection between headaches and morbid states of the nose was transmitted by the ancient physicians to those of mediæval and subsequent times. He clearly indicates, in recording a number of his own cases (some of which are quoted by Mackenzie) that he recognised it. I find the following remarks—which have special reference to a case of headache—among my notes of Wepfer's writings: "The proximate cause appears to be mucus retained within the depths of the nasal cavities and inspissated by the respired air. The abuse of snuff had favoured its detention."¹ Again, he observes of another case, "the nares have now been obstructed for a year . . . if the mucus is drawn from the head or nares into the fauces, the pains remit."²

J. Fordyce (1758), who quotes Wepfer, points out that hemi-crania sometimes arises, "ex obstructis naribus,"³ and Bartholinus records a case of headache caused by nasal calculi.⁴

In Morgagni's work on the "Seats and Causes of Disease"⁵ will be found an interesting account of headache arising from worms in the nose and frontal sinuses. This author sets right many of the erroneous views concerning the subject which had up to his time prevailed. He remarks that cases are recorded in the "Sepulchretum" of various kinds of worms, flies, "and with God's leave even scorpions," as he quaintly puts it, being found within the skull, but he is justly dissatisfied with the evidence, denying that they could pass thither from the nose, since "not even the smoke of tobacco could do this, as had been asserted by some." In his belief worms sometimes form in the frontal sinuses, thereby causing headache, and he quotes authors who had actually seen headache cured by the escape of worms from the nose, and who also describe methods by which they were in some cases drawn out. He further quotes Avicenna, who gives the symptoms and cure of the

¹ Wepfer, "De. Affect. Capitis," 1727, p. 82.

² *Ibid.*, p. 103.

³ "Historia de Febris Miliaris et de Hemicrania," Lond. 1758, p. 86.

⁴ T. Boneti, "Sepulchretum," Lug. 1700, pp. 62, 63.

⁵ Vol. i., Letter i., transl. by Benjamin Alexander, Lond. 1769.

disorder; Henckelius, who had seen a case of it, and “judged that the worms had been perhaps drawn up into the cavities of the nose by incautiously smelling of flowers”;¹ Boerhaave, who in his “*Institutes Rei Medicæ*” (Ad. § 792) mentions a girl cured by him, “whose pituitary sinuses were all full of worms;” and lastly Littré, who declared that he would not hesitate to trephine the frontal sinuses if all other assistance failed.

James Hill (1772) records the case of “a surprising worm in the sinus frontalis,” which caused violent pain in the forehead and nose.²

Tissot (1785)³ alludes to the termination of megrim by epistaxis, and reports the case of a man of his acquaintance who suffered from megrim of the side of the head corresponding to that side of the nose in which a nasal polypus existed.

Numerous theses on headache were written during the last century, and though they contain little or nothing that is original, they are useful as indicating the knowledge and opinions of the time. What is pertinent to the present stage of our inquiry is that they make constant reference to the condition of the nasal and accessory cavities in headache. Thus Stuckens⁴ asserts that the parts affected in “external” headache are the pericranium and its neighbourhood, and the pituitary membrane lining the frontal and sphenoidal sinuses. He then goes on to say that in the former case the pain affects the lower parts of the frontal bone and supra-orbital regions, whence it may extend to the nose. This latter fact has been alluded to by modern writers, and I have frequently observed it myself. The headache may be due to inflammation of the said membrane or its sequelæ, to polypi and to worms. In regard to the latter cause, Stuckens mentions a case, published by Vaillant, of a woman who for years suffered from insupportable headache due to insects (earwigs!). “These insects,” he remarks, “had entirely devoured . . . the nasal

¹ And to this he adds the remark that others, more correctly, attributed their presence in the nasal cavities to the deposits of ova in the frontal sinuses.

² “*Cases in Surgery*,” Edin. 1772, p. 52.

³ “*Traité des Nerfs et leurs maladies*,” Genève, 1785, p. 105.

⁴ “*De dolore Capitis*,” Brux., 1787.

cartilages." The patient was relieved by their escape, but as they had left eggs behind them, which subsequently hatched, the trouble continued.

Deschamps (1804) attributed hemicrania to disease of the frontal sinus which, he argued, was endowed with great sensibility.¹

J. Carron (1811)² records a case of hemicrania, accompanied by a profuse discharge of pus from the corresponding side of the nose.

Sauvages, and subsequently Devilliers and Deschamps (fils), traced the source of the pain when situated in the lower forehead and the root of the nose to the membrane lining the frontal sinuses; according to Labarraque³ the headache in these instances is heavy, a sensation of weight being felt in the frontal sinuses.

Cotin (1847)⁴ writes in the same strain. He asserts that diseases of the nose constitute a fertile source of headache—instancing, somewhat unhappily, epistaxis; also, that in coryza there is heavy frontal headache, and in such cases he recommends that leeches be applied to the nostrils, and the nasal mucous membrane stimulated by snuff. He points out that all diseases of the nasal fossæ and of the frontal, maxillary, and sphenoidal sinuses, such as polypi, foreign bodies, and worms, may induce headache.

Mombert (1848)⁵ alludes to the connection between catarrh of the frontal sinuses and headache (*Stirnhöhlenschmerz*).

Sieveking (1854)⁶ points out that catarrhs are frequently accompanied by severe throbbing frontal headache, which he partly attributes to implication of the frontal and sphenoidal sinuses.

Symonds (1858)⁷ suggests that the headache of common catarrh may sometimes be due to involvement of the Schneiderian membrane.

¹ "Traité des Maladies des Fosses Nasales," &c., Paris, 1804.

² *Jour. Gén. de Méd., Chir. et Phar.*, Paris, 1811, vol. xl., pp. 369-372.

³ Labarraque, "Essai sur la Céphalalgie," Paris, 1837, pp. 28.

⁴ "De la Céphalalgie," Paris, 1847, p. 16.

⁵ *Vierteljahrschrift f. die Praktische Heilkunde*, 1847, Band ii. p. 119.

⁶ *Med. Times and Gaz.*, 1854, vol. ii., p. 209.

⁷ *Ibid.*, 1858, vol. i., p. 421.

From these references—and they might be multiplied almost indefinitely—it is very evident that our knowledge of the connection between the nose (with its accessory cavities) and headache was handed down through the middle ages to the present century. About the middle of it, however, this connection appears to have been lost sight of; it in fact remained practically forgotten till it was rediscovered by Hack, and made known by him in his memorable paper, published in 1884.¹

Although specialism in medicine has its disadvantages, none can deny that it has also very great advantages. It is, there can be little doubt, the special study of diseases of the nose that has led to the discovery, or rather re-discovery, of the fact that they are the cause of manifold neuroses. Thus in 1871 Voltolini drew attention to the connection of asthma with morbid states of the nasal mucous membrane, and although, as Mackenzie has pointed out, this was already known to the older physicians—for example Wepfer—to Voltolini belongs the merit of having stimulated inquiry in this direction. His observations were confirmed by Fraenkel, Hänish, Hartmann, Schäffer, and others. Finally in 1884 appeared Hack's work, in which it was contended, not only that asthma, but a host of other neuroses, including headache, may be thus excited; and from that time to the present a small army of observers have come forward to corroborate, in the main, Hack's statements. It may now be regarded as certain that abnormal conditions of the nasal and accessory cavities may take part in provoking headache, megrim, trigeminal neuralgia, sneezing, asthma, spasmodic cough, laryngeal spasm, aphonia, cardiac neuroses, nocturnal incontinence, nightmare, stammering, general nervousness, asthenopia, *muscæ volitantes*, vertigo, convulsions.

It now only remains for me to refer briefly to the recent writings treating of headaches owning a nasal origin.

R. C. Brandeis writes on headaches due to disease of the nasal and adjacent cavities—frontal, ethmoidal, and sphenoidal.²

¹ "Ueber eine operative Radical-Behandlung bestimmter Formen von Migräne, Asthma, Heufieber," Wiesbaden, 1884.

² *Med. Times*, Phil. 1883, April 7, p. 486.

M. Schäffer records cases of megrim, intense frontal headache, and supra-orbital neuralgia due to nasal trouble,¹ as does also L. L. Palmer.²

L. Götze³ has a good paper on megrim (and other neuroses) due to nasal disease.

E. Woakes⁴ has treated of "Nasal polypus with neuralgia, etc., in relation to ethmoiditis."

H. Gradle⁵ has recorded cases of headache from overlooked causes in the naso-pharynx.

M. E. Berger⁶ has treated of diseases of the sphenoidal sinuses which, he contends, manifest themselves chiefly by headache, orbital and frontal, while Hering asserts that headache is often the sole manifestation of disease of the sphenoid. He has a long article on nasal neuroses.⁷

Joal, Moure, and Schiffers also have remarks on nasal headache.⁸

J. O. Roe⁹ cites a number of cases of headache due to abnormal conditions of the nasal mucous membrane.

Netchayeff¹⁰ reports a case of cephalalgia due to nasal disease, and cured by treatment directed to the latter.

S. Scheinmann,¹¹ in an elaborate series of papers, describes cases of facial neuralgia and headache of nasal origin.

Guye¹² (Amsterdam) in his able paper read before the British Medical Association on "Aprosexia" (or inability to concentrate the attention), occurring as the result of nasal disease, maintains that headache is the most common *remote* symptom of the latter, and that the state of the nose should be inquired into in every case of habitual headache with loss of memory.

At the same meeting of the British Medical Association,

¹ *Deutsche Med. Wochensh.*, 1884, No. 23, p. 357, and No. 24, p. 376.

² *Canad. Pract.*, vol. ix., No. 10, Oct. 1884.

³ *Monatschrift f. Ohrenheilkunde*, Sept. and Oct. 1884.

⁴ "Nasal Polypus with Neuralgia," etc., Lond., 1887.

⁵ *Jour. of Am. Med. Ass.*, Sept. 8, 1888, p. 339.

⁶ *Ann. des Mals. de l'Oreille*, vol. xiv., p. 264.

⁷ *Ibid.*, vol. xii., pp. 45, 89.

⁸ *Ibid.*, p. 265.

⁹ *Med. Record*, New York, 1888, vol. ii. p. 200.

¹⁰ *Med. Obzrenié*, Nov. 9, 1888.

¹¹ *Berl. Klin. Wochensh.*, 1889, Nos. 14, 15, 18, 19, 21.

¹² *Brit. Med. Jour.*, 1889, vol. ii., p. 709.

William Hill and Scanes Spicer contributed valuable papers on the same subject.

Menière¹ records a case of daily headache of two years' standing cured by nasal cauterisation and the removal of adenoid masses.

Réthi² reports cases of hemicrania and other neuroses cured by treating nasal disease.

Coupard and Saint-Hilaire³ record twenty-one cases of neuralgic headache dependent upon nasal affections.

Goris⁴ mentions megrim among the neuroses caused by nasal disease.

Greville Macdonald⁵ observed supra-orbital neuralgia in eight out of thirty-five cases of disease of the maxillary sinus, and in five of these "it supervened every morning regularly at the same hour."

Mayo Collier⁶ (1892) records three cases of frontal headache, two of which were associated with disease of the frontal sinuses, while the third was relieved by the removal of a piece of bone the size of a sixpenny piece from over the sinuses in the middle line, though no actual disease was discovered.

Anatomical.—The nasal cavity is divided medially by the septum, and each half communicates with several hollows, or sinuses, situated in the frontal, ethmoidal, maxillary, and sphenoidal bones. The frontal sinus and the anterior ethmoidal cells communicate, by means of the infundibulum, with the posterior part of the middle meatus; the maxillary sinus (antrum) opens into its middle part; while the posterior ethmoidal cells open into the anterior part of the superior meatus, and the sphenoidal sinuses upon the roof of the nose just above it. These sinuses are, with the exception of the maxillary, imperfectly developed at birth, and remain small till

¹ *Gaz. des. Hôp.*, Sept. 5, 1889.

² *Internal. Klin. Rundschau*, Vien., Dec. 22, 29, 1889.

³ *Med. Abst.*, N.Y., Feb. 20, 27, March 6, 20, 1890.

⁴ *Revue de Laryng.*, d'Otol., etc., Paris, Jan. 1, 1890.

⁵ "Diseases of the Nose," Lond. 1892, p. 174.

⁶ *The Medical Week*, Dec. 16, 1892, p. 27.

the period of puberty, when they rapidly increase in size. All become larger in advanced life.¹

The nasal cavity and these communicating sinuses are lined with one continuous mucous membrane, termed by the older writers the pituitary membrane. Where it lines the sinuses, it is thin; over the walls of the nasal cavity itself, it is much thicker, very vascular, and erectile in nature. This is especially the case with the part covering the turbinated bones—above all, the inferior turbinate, where its structure is somewhat like that of the corpora cavernosa. The erectile tissue is highly developed at the anterior and posterior portions of the inferior turbinate, but it may also be observed on the floor of the nose, and on the septum. The mucous membrane narrows the nasal cavity considerably, rendering the turbinate bones, and in particular the lower pair, longer and more prominent; it also narrows the apertures which communicate with the adjacent sinuses. Thus the opening of the infundibulum is nearly hidden by an overhanging fold of membrane, and in like manner the aperture of the capacious antrum is considerably diminished.

The nasal and accessory cavities are all supplied by the fifth nerve. The septum and fore-part of the nasal fossæ, including the anterior portions of the right lower turbinate bones, are supplied by the nasal nerve, and the remaining portion by Meckel's ganglia. As the nasal nerve, through the long ciliary, supplies the globe of the eye, the sympathy existing between the nose and the eyes is explained, and it might lead us to expect disease of the anterior part of the nasal cavity to implicate the eyes in preference to other parts.

The course of the nasal lymphatics is interesting. Axel Key and Retzius have shown that they may be injected from the sub-arachnoid and sub-dural spaces of the brain and spinal cord. They certainly communicate with the lymph spaces in the nasal mucous membrane, and these spaces again with the nasal cavity itself, by means of intervals between the epithe-

¹ It would appear from Millican's researches, that the brain does not increase in size after about the seventh year, and that the inner table of the skull then ceases to grow. The outer table, however, continues growing, and becoming separated in the frontal region from the inner, forms the frontal sinuses.

lial cells. There is thus a direct communication between the cranial and nasal cavities; wherefore the view of Hippocrates and Galen, that nasal fluxes came from the brain—a tradition still surviving in the terms “*rhume de cerveau*” and “*Schnupfen*”—is not so absurd as might at first appear.¹

To these preliminary anatomical remarks I may add that it will be convenient to regard the nasal cavity and its accessory chambers as constituting one organ, and a neurosis resulting from disease of any part of it as a nasal neurosis. Hence we may speak of headache arising from disease of the ethmoidal, maxillary, or other sinus as a *nasal headache*.

We are now in a position to inquire into the nature of the lesion causing nasal headache.

Disease may originate in the nasal cavity and spread thence to the accessory chambers (as may happen, for instance, in nasal catarrh), owing to the continuity of the mucous membrane by which they are all lined; or it may originate primarily in one of these latter. When we reflect how extensive are the various nasal sinuses, what a large extent of mucous membrane lines them, and how close is their proximity to the aching structures in headache, we shall not be surprised at disease in them causing headache. A few words on disease thus arising.

Primary disorder of the frontal sinuses is rare, and is therefore an infrequent cause of headache. The older physicians record several instances of intolerable headache arising from parasites in them, and similar cases have been mentioned by military surgeons of later times, but they are practically unknown in this country. According to Mayo Collier, “by far the most common affection of these spaces is distension caused by the retention and accumulation of the products of inflammation,”² and he asserts that headache involving the root of the nose is a constant symptom of empyema of the frontal sinuses. Other primary affections to which they are liable are exostoses, polypi, and other growths. All these are, however, very rare.

¹ See on this subject, “*Lehrbuch der Ohrenheilkunde*,” A. von Trölsch, Leipzig, 1881, p. 347.

² *The Medical Week*, Dec. 16, 1892, p. 26.

Primary affection of the ethmoid—in the shape of ethmoiditis—has been described by Woakes, who attributes to it a large share in causing nasal disease and also neuralgia. Disease of the sphenoid is obscure in its manifestations. Headache may be the only one (Hering, Berger).

Disease of the maxillary sinuses is frequently accompanied by pain. This was a prominent symptom in fifteen out of thirty-five cases observed by Greville Macdonald, “while in fifteen it could be elicited by percussing over the malar or nasal bones. The usual seat of the pain, when spontaneous, is in the cheek, sometimes radiating towards the ear, or more often diffused and ill-defined. In eight cases the pain was localised chiefly in the supra-orbital region. In five of these it supervened every morning regularly at the same hour, increasing steadily in intensity until the antrum was evacuated and pus began to flood from the nose. In one case the pain was preceded by formication and pricking, and in another it gradually increased in intensity until the whole head was racked with the most intolerable headache.”¹

In regard to the nasal cavity itself: practically any disease of it is capable of causing headache. Catarrh with swelling or thickening of the nasal mucous membrane is probably the most common, and next perhaps, in order of importance, is nasal polypus. Marked deflection of the septum, completely obstructing one side of the nose, may also be a cause; but the fact is, any nasal obstruction should receive our careful attention. Greville Macdonald has advanced cogent arguments for concluding that such obstruction is a fertile source of all manner of disorders in the respiratory tract, for when an individual with partial nasal obstruction inspires through the nose, there necessarily results a diminution of atmospheric pressure behind the part obstructed, and it should be remembered that even when the obstruction is considerable, nasal breathing is still kept up (especially in children), so strong is the instinct for this kind of breathing. Now such diminution of pressure causes capillary engorgement in the mucous membrane behind the seat of obstruction; hence is induced a tendency to nasal, pharyngeal, laryngeal and

¹ “Diseases of the Nose,” Lond. 1892, p. 174.

bronchial catarrh. This engorgement, if persisting for some time, may lead to hypertrophy: hence are produced hypertrophy of the nasal mucous membrane, cartilagenous and osseous thickening of the septum, "adenoid vegetations" (which arise from hypertrophy of the lymphoid tissue normally so abundantly situated in the mucous membrane lining the roof of the retro-nasal space), and possibly also enlargement of the tonsils.

Most writers on the subject of nasal neuroses attribute a prominent part to swelling of the erectile tissue covering the middle and inferior turbinate bones. Hack confined his treatment to that belonging to the latter pair, believing it to be mainly at fault, and this appears to be the prevailing belief. According to J. N. Mackenzie there exists in the nose only a limited area of tissue capable, when irritated, of causing neuroses, viz.: the cavernous bodies of the "cornets;" while according to Franck, irritation of different parts produces different results.¹ But even granting that the mucous membrane of the lower turbinate bones is probably the most sensitive area in the nasal cavity, and hence the most likely to provoke a neurosis, we may yet regard it as certain that disease in any part of the nasal tract is capable of exciting reflex disturbance.

Scheinmann has suggested the following method of ascertaining what portion of this tract constitutes the area of irritation (*Reiz-stelle*) in a given neurosis. He applies cocaine to the interior of the nose. If the nervous manifestation (asthma, megrim, or what not) ceases within ten minutes, he concludes that nasal irritation is the cause. He then, after the anæsthetic effects of the cocaine have passed off, applies cocaine to various portions of the nasal mucous

¹ François-Franck, *Arch. de Phys. Norm. et Path.*, 1889, p. 538.

Greville Macdonald observes that mechanical irritation of the anterior parts of the nasal fossæ may cause sneezing and lachrymation, the membrane lining the anterior wall of the fossæ above the vestibule being generally the most sensitive. "Only less sensitive is the corresponding portion of the septum; while distinctly less provocative of these reflex phenomena are the anterior extremities of the middle and inferior turbinated bodies. . . . Passing backwards, the septum still appears to be the most sensitive region; but as the posterior regions are approached," there is a tendency rather to cough than to sneeze, on irritation.

membrane successively, and if the neurosis disappears within ten minutes after a certain area has been anaesthetised, he concludes that that constitutes the seat of irritation. The latter may also sometimes be found by successively irritating the various nasal areas by means of a probe, and discovering if in this way the neurosis may be provoked.

In reflecting upon nasal disorders as a cause of headache, we must bear in mind their exceeding frequency. Nasal, pharyngeal, and laryngeal diseases are more prevalent now than they have ever been. This is one of the many evil results of modern civilisation and town-life. Compare the condition of primitive man—rising and going to rest with the sun, engaged all day long in healthy outdoor pursuits, and breathing a pure ozone-laden atmosphere—with that of the modern town-dweller, who at the very best is compelled to breathe air impregnated with impurities, who sleeps away a large part of the daylight, and spends the greater part of the night in gaslit rooms, who often smokes inordinately, and is exposed to frequent and sudden changes of temperature—compare, I say, the conditions of the two, and we shall have little difficulty in understanding the ever-increasing frequency of nasopharyngeal and laryngeal diseases among the moderns, and the corresponding increase in the number of specialists who devote themselves to their treatment.

I may here allude to the “stiffness of the nose,” which a large number of people experience upon waking in the morning. I think this may be a co-factor in the causation of the headache and other nervous symptoms which so often manifest themselves in the early hours of the day.

But, it may be urged, nasal disease may exist without headache, and further, the fact that headache accompanying nasal disease is removed by curing the latter, affords no argument in favour of the nasal origin of the headache, since the relief may be due to counter-irritation. Even mild treatment applied to so sensitive a tissue as the mucous membrane of the nose must act in some degree as a counter-irritant, and in some cases the treatment is by no means mild, as when a polypus is wrenched off, or the membrane is cauterised either by chromic acid or the actual cautery. To which objections I would reply: No doubt in

some cases the relief to the head is in part due to counter-irritation, as it is when obtained by the application of a blister to the nape of the neck; and it is also indisputable that abnormal conditions of the nose may exist without producing headache. I have, indeed, often seen such cases. Thus:

F. æt. 14. Suffers from chronic rhinitis, with hypertrophy of the nasal mucous membrane (notably of that covering the inferior turbinate bones), post nasal growths, and enlarged tonsils. Is at present absolutely free from headache.

M. æt. 21. For some months has suffered from obstruction of the nares, due to swelling of erectile tissue covering the inferior turbinate bones and adjacent parts (the swelling subsides on the application of cocaine); is liable to headache, but it has not been worse since the onset of the obstruction.

F. æt. 20. Has recently suffered considerably from headache, for which no cause can be discovered. The right side of the nose is completely obstructed by deflection of the septum to this side. The left turbinates—notably the inferior one—have grown so as to fill up the cavity on this side. The mucous membrane is, however, quite healthy, and seeing that the condition has apparently existed for many years, there is probably no causal relation between the nasal condition and the headache.

The like is, however, true of other peripheral irritations known to be provocative of neuroses, the fact being that disease is the result not of one, but of many causes, and that which may at one time be ineffectual in setting up a neurosis, may at another, owing to the co-operation of other factors, be capable of turning the balance in its direction. [As an example, we may instance asthenopia, which, though an acknowledged, is by no means a necessary, cause of headache. Similarly, a “granular” condition of the pharynx (present in 90 per cent. of Londoners—Lawrence) may be often unaccompanied by any ill effects, but at other times it may, there is reason to believe, induce symptoms referable to the throat and larynx (McBride).]

Nevertheless, making every allowance, first, for the fact that nasal disease may occur without headache, and secondly, for the possibility of the relief afforded in headache by treatment directed to the nose being sometimes wholly, and at others in part, due to counter-irritation, I cannot doubt that it is often

the diseased state of the nose that is the cause of headache. When a patient has for years suffered from headache, and that headache is permanently cured by treatment directed to the affection of the nose, surely the only conclusion open to us is that the latter was the cause of the former? The following are instances in point:

M.æti. 37. Was a constant martyr to headache, which involved the left side of the head chiefly. After the headache had lasted for some time the escape of green matter from the left nostril often afforded relief. Examination disclosed a sensile polypus, growing from the right upper turbinate bone, and hyperæmia with slight hyperplasia of the mucous membrane covering left side of septum, and left, middle, and inferior turbinate bones. The patient was transferred to Mr. Brodie, and returned cured of his nasal complaints, with marked improvement of the headache, which subsequently vanished.

M.æti. 22. Suffered from chronic turgescence of the mucous membrane covering the inferior turbinate bones and adjacent parts. At times this became so pronounced as entirely to obstruct nasal breathing. The patient then suffered from a dull frontal headache, which completely incapacitated him from intellectual work. After treatment directed to the cure of the nasal condition, the tendency to these headaches disappeared.

It is important to bear in mind that a patient rarely finds out for himself the relation between a peripheral irritation and the neurosis it has excited. Just as he fails to recognise that his neuralgia is due to dental trouble, his giddiness to ear-disease, his melancholy to gastric disturbance, so also is he often incredulous when told that his headache is caused by nasal disorder. The physician must not, therefore, depend upon information volunteered by the patient, but must systematically investigate for himself every source of peripheral irritation.

Mode in which Nasal Lesions cause Headache.—Nasal headache may be set up in various ways, separate or combined. (1) As Guye¹ suggests, structural disease of the nasal mucous membrane obstructs the lymphatic circulation and so causes waste products to accumulate in the brain and meninges, whence arise headache and other nervous symptoms. (2) The

¹ *Brit. Med. Jour.*, Sept. 1889.

narrow orifices of communication between the main chambers of the nose and its accessory cavities are readily closed up by hypertrophic changes in the mucous membrane lining them; and when they are thus obliterated, the air in the cavities becomes absorbed, and a negative pressure is established within them, the effect of which is, as Guye points out, to produce collateral hyperæmia after the fashion of a dry cup. This he deems the great cause of nasal headache, which he observes may be temporarily relieved by using the Politzer bag, just as may the tenderness over the mastoid cells which accompanies acute otitis, and which is due, he supposes, to a similar rarefaction of the air in those cells. (3) It has been suggested that since nasal disease is known to cause reflex hyperæmia of the skin of the nose and adjacent parts, it may cause similar hyperæmia of other regions, as of the meninges, etc. (4) One of the most noticeable effects of nasal disease is interference with breathing: the individual becomes a mouth breather, and this has several obvious disadvantages. It may even interfere with the proper aëration of the blood, and thus help to induce toxic headache. (5) Of late years a good deal has been written on the sympathy between the nose and the eyes, and that such sympathy exists is indisputable. It follows that nasal disease may indirectly cause headache through the eyes;¹ it may, for example, induce asthenopia, a fertile source of headache.

Nature of Nasal Headache.—The pain, as we should expect, is most often frontal (Joal, Schiffers, Moure, Scheinmann, and others). It is felt chiefly in the lower part of the brow, just over the eyes, and it frequently involves the bridge of the nose. It is for the most part dull and heavy. Sometimes (as happened in one of Scheinmann's cases) a feeling of weight is experienced apart from the pain, and it may constitute a troublesome element in the headache. This author also speaks of a dragging sensation between the forehead and the nose, a symptom of which some of my patients have complained. According to Lauder Brunton, headache from nasal disease is usually situated at the top of the head, just behind the commencement of the hairy scalp.² The pain across the bridge of

¹ See p. 78.

² "Disorders of Digestion," Lond. 1886, p. 107.

the nose, of which Schiffers speaks, early attracted my attention while studying these headaches. It not infrequently happens that sufferers from headache complain of a sense of obstruction here during the pain, this being followed by discharge from the nose (varying from a watery to a puriform fluid), with relief to the obstruction and the pain. I had observed not a few such cases before I was aware of the connection between nasal disorders and headache. In some of these there is no doubt organic disease of the nose, but it is not improbable that in others the condition is largely nervous, and analogous to those critical evacuations which sometimes occur upon the subsidence of a paroxysm of megrim.¹

Mombert's description of headache induced by catarrh of the frontal sinuses may be briefly referred to here. The pain, he considers, involves the frontal sinuses themselves (*Stirnhohlenschmerz*), but is chiefly felt in the forehead spreading thence to the eyebrows; and there is a feeling of weight, as if the eyes were being pressed out of the head. The pain is dull and heavy, rarely stabbing or boring, and may continue for weeks, months, or even years. It is worst in the morning shortly after getting up, diminishing as the day wears on, so that by the evening it has quite disappeared—facts which he explains by supposing that the mucus collects in the frontal sinuses, gradually escaping into the nose during the day.²

No variety of headache more disturbs the intellectual processes than this. In fact, nasal disorders, quite independently of the headache they produce, may interfere profoundly with thought, as anybody who has suffered from a cold in the head must know for himself. To Guye belongs the honour of having first adequately insisted upon this point. In a communication to the British Medical Association,³ 1889, already referred to,⁴ he points out that persons with nasal disease are very apt to manifest impairment of the cerebral functions, as, for example, defect in memory and in the power of fixing the attention. To this condition, which he contends is, next to headache, the

¹ Both Innis and Stapleton (*op. cit.*) allude to the fact that headache may disappear with the discharge of mucus from the nose, while Hippocrates observes that it may clear up upon a similar discharge of pus.

² *Op. cit.*, pp. 124-5.

³ See *Brit. Med. Jour.*, Aug. 1889.

⁴ See p. 91.

chief remote manifestation of nasal disease, he has given the name *aprosxia*.

Diseases of the Pharynx and Naso-pharyngeal Space cause headache. Adenoid vegetations in the latter region may be classed with diseases of the nose, and do not require further consideration.

Acute affections of the throat are attended by fever, and to this, rather than to the local reflex irritation, the headache which is apt to accompany them is chiefly due, though it seems certain that such irritation also may cause headache, just as tonsillitis, it is well known, causes earache. Thus we find Brunton giving sore-throat as a cause of headache, and he observes that in enlarged and inflamed tonsils the headache "is apt to run up in front of the ears to the vertex."

According to Legal¹ and other writers, the headache which accompanies disease of the pharynx is apt to involve the occiput, and von Tröltsch insists upon the fact, that in examining the retro-nasal space with the finger pain is often immediately experienced at the occiput.² This is as we should expect, seeing that the posterior wall of the pharynx is really formed by the posterior body wall—*i.e.*, the back of the neck, which is contiguous to the occiput.

In most of the cases of sore-throat (generally tonsillitis) in which I have inquired after headache, the pain has been frontal, but in a certain number it has involved the occiput, or this and the back of the neck. Thus two patients complained of sore-throat with "pain and stiffness in the back of the head and neck." It does not of course follow that in such cases the one is the cause of the other: both might be the direct result of taking cold.

Von Tröltsch regards inflammation in the post-nasal space as a common cause of headache and neuralgia. "Numerous

¹ Legal, *Deutsches Arch. f. Klin. Med.*, B. xl., pp. 201-216. Ziem maintains (*Monatschrift f. Ohrenheilkunde*, Nos. 8 and 9, 1886) that pain involving the occiput and nucha is a special symptom of retro-pharyngeal affections.

² "Lehrbuch der Ohrenheilkunde" Leipzig, 1881, pp. 336, 345. Vergeley (*L'Union Médicale*, t. xlv., 1888, p. 322) observes that examination of the pharynx may cause pain in the occiput, over the mastoid processes, and in the nape of the neck.

observations," writes he, "on patients with chronic retro-nasal catarrh convince me that many kinds of neuralgia which are generally regarded as headache, frontal or occipital, or (on account of their onesidedness) as megrim, stand in causal relation with this disorder."¹ And after describing the complex nerve-supply to this region, he remarks upon the improbability of disease in this region manifesting itself in a purely local fashion.²

¹ *Loc cit.*, p. 345.

² The following writings may be consulted in connection with headache and other neuroses occurring reflexly as a result of Diseases of the Pharynx and Naso-pharyngeal Space :

LICHTWITZ:—"Ueber Nasen- und Rachen-Reflex Neurosen," *Arch. f. Ohrenheilkunde*, vol. xxix., p. 314.

ZIEM maintains that "pain in the nape of the neck is above all the appanage of retro-pharyngeal affections" (*Monatschrift für Ohrenheilkunde*, 1886, Nos. 8 and 9).

GORIS mentions megrim and other neuroses as following upon nasal disease and adenoid vegetations of the naso-pharyngeal space (*Ibid.*, p. 315).

MEYER:—"On Reflex Neuroses from Pharyngeal Disease" (*Ibid.*, vol. xxvii., p. 67).

MENIÈRE:—*Ibid.*, vol. xxviii., p. 142.

RUAAULT:—"Névrophathiques d'Origine amygdalienne": *Arch. de Laryng*, etc., 1887-8, t. i. p. 154.

NORDISK:—"Reflex Neuroses of the Nose and Pharynx": *Med. Arkiv*, vol. xvii., No. 27.

MCBRIDE:—"Naso-pharyngeal Reflex Neuroses": *Brit. Med. Jour.*, 1887, vol. i., p. 205.

GRADLE:—"On Headaches from overlooked causes in the Naso-pharynx and Ears": *Jour. of Am. Med. Ass.*, 1888, Sept. 8, p. 339.

SCHMIEGELOW:—"Reflex neurosen der Nase und des Rachens": *Nord. Med. Arkiv*, Bd. xvii., No. 27.

BRAUN records a case of intense headache which was cured by the removal of "adenoids": *Wiener klin. Wochenschr.*, 1889, No. 46.

CHAPTER XI.

DISORDERS OF THE EAR.

THE ear consists of three portions, an external, a middle, and an internal, the Eustachian tube properly forming part of the middle ear. Disease in any of these parts may cause earache and manifold reflex neuroses, amongst which are included pains in various regions of the head.

A few words on the nerve-supply of the ear. The auricle is supplied on its posterior aspect by the small occipital above, and by the great auricular below; the latter nerve also supplies its lower anterior surface, but the greater part of this surface, as well as the exterior auditory canal, is supplied by the auriculo-temporal, which brings the ear into sympathetic relation with the great trigeminal nerve. The middle ear is supplied by the tympanic plexus, which establishes wide sympathetic relations, while the labyrinth receives branches from the *portio mollis*.

The following reflex aural neuroses are well recognised; faceache, supra-orbital pains, pains in the neighbourhood of the ear, in the affected half of the head, or indeed in any part of it, coughing (ear cough), sneezing, affections of the pharynx, nausea, vomiting, vertigo, nystagmus, convulsions, psychoses, cardiac irregularity, syncope.

Hildanus was apparently one of the first to record a reflex aural neurosis. He notices¹ "that pain on one side of the head, with numbness of the left arm and leg, menstrual suppression, and epileptic fits, have all been occasioned by a glass ball, not larger than a pea, sticking in the ear."

¹ See Robert Whytt, "Observations," &c., Edin. 1765, p. 18.

Von Tröltzsch records a very similar observation,¹ while the case has been cited of a child suffering from obstinate chronic vomiting which was at once stopped by extracting a bean from each ear.² Walker Downie, who has an interesting article on aural reflexes,³ alludes to the frequency with which ear-cough is induced by using a cold speculum, and to the many reflex effects of a mass of dry cerumen lying loose within the meatus, among others, cough (which is then often erroneously regarded as of gastric origin), vomiting, and convulsions. Several cases of the latter have been recorded. Mendoza, for instance, tells how he was able to induce an epileptic fit by pressing upon an aural polypus.⁴ Downie further instances a case of syncope which resulted from touching a certain part of the ear with a probe, and one of cardiac irregularity brought on by accumulation of cerumen. Notes on other cases may be found in the *Archiv für Ohrenheilkunde*,⁵ as also on the relation of aural trouble to psychoses.⁶

We now, however, are only concerned with pains about the head, and among these it is convenient to consider earache resulting from ear disease, although this cannot strictly be regarded as reflex.

It is necessary to distinguish this variety from the earache which results from disorder in some other structure than the ear, and which will be treated of in due course. The former we may term organic earache, the latter functional. The pain in organic earache is always referred to the external ear, no matter what part of the ear is diseased. Thus Vergeley

¹ *Lehrbuch der Ohrenheilkunde*, Leip. 1881, p. 556.

² *Lancet*, April 28, 1866.

³ *Ibid.*, 1888, vol. i., p. 1179.

⁴ *Revue mens de Laryng.*, No. 8.

⁵ Vol. xxvii., p. 89; vol. xxviii., p. 142.

⁶ *Revue mens. de Laryng.*, 1887, No. 8; *Deutsche Med. Wochenschr.*, 1891, No. 24. See also Köppe, *Allg. Zeitsch. f. Psych.*, vol. xxiv., p. 10.; I. Luys, *Ann. des Mals. de l'Oreille*, 1877, p. 203. Other references to reflex aural neuroses are: *Monatschr. f. Ohrenheilkunde*, No. 5, 1889; *Deutsche Med. Wochenschr.*, 1885, No. 49; *Arch. f. Ohrenheilkunde*, vol. vi., p. 157; *Internat. Klin. Rundschau*, 1885, No. 23; *Ann. des Mals. de l'Oreille*, vol. xvii., p. 62; vol. xiv., pp. 174, 429; "Functional Nervous Disorders," New York, 1887, G. T. Stevens, pp. 80-81; Virchow, "Arch.," Band lxviii., by Moos, p. 433; *Revue mens. de Laryng.*, 1886, No. 6; *Berl. klin. Wochenschr.*, 1891, No. 43; Ebende, vol. xxii., p. 113.

writes in effect, "Where the Eustachian tube or the middle ear is the seat of inflammation, the pain is referred to the external ear or its neighbourhood."¹

Practically, any affection of the ear may cause earache. The presence of hardened cerumen is by no means an infrequent cause, though often overlooked.

The following is one among several other instances of this kind which I have observed:

F. æt. 31. Complained of violent stabbing pain in the right ear, which involved more or less the whole right side of the head, including the right eye, and shot down the right side of the neck. Was partially deaf in the affected ear. Examination disclosed a large mass of cerumen, upon the removal of which the patient exclaimed: "I can hear too much now. I can feel the pain going already." Patient was seen two weeks after, when all pain had gone, but she complained of a "weary, heavy feeling" in the right side of the head, especially when lying on this side.

Perhaps the most common cause of organic earache is otitis media. When acute it occasions intense agony, which is greatly relieved by rupture of the drum membrane and escape of pus. Chronic otitis is another cause, the pain increasing in intensity when the purulent discharge ceases, symptoms of local meningitis then often manifesting themselves.² Such cases are familiar to every physician, though it is scarcely correct to assume that the serious symptoms which generally accompany the cessation of the discharge are always due to a local meningitis. According to McBride the pain is increased by moving the jaws or pulling the ear, if due to disease in the external meatus, while blowing the nose or pressure on the tragus will increase it if it is caused by disease of the middle ear.³

Organic earache is by no means necessarily confined to the ear. It has long been known that the pain may radiate to adjacent regions,⁴ involving perhaps the whole half of the

¹ *L'Union Médicale*, Sept. 4, 1888.

² "Disease in Children," Eustace Smith, 1889, p. 369.

³ "Diseases of the Throat," &c., Edin. 1892, p. 392.

⁴ "Sharp pain, starting in the tympanum and mastoid region and radiating to almost the whole of the affected side of the head, is a constant accompani-

head, or even extending to the opposite side. In other cases symmetrical parts of the head may be affected.

L. Suné holds that pain felt in the occiput and side of the neck, with purulent otitis, has a very grave significance, for it indicates, he believes, implication of the meninges and is always present in cases which end fatally.¹ But its significance is certainly not necessarily grave, as the following case shows:—

M. et. 33. Had shooting pain in the left occiput and neck, and in the left ear, which discharged; hearing on this side was defective. After the discharge the pain greatly abated. Examination disclosed a small perforation at the anterior and lower part of the membrane. The subsequent course of this case showed that the mischief was confined to the middle ear, the meninges being entirely exempt from disease.

When aural disease gives rise to pain in the ear, the attention is directed to the ear as the seat of evil. It may, however, happen, as Urbantschisch observes, that “the pain appears not so much in the ear as in some other part of the head, *e.g.*, the temple, or occiput.”² This point is further brought out by Legal³ in a long paper on what he terms *cephalalgia pharyngo-tympanica*, or headache resulting from aural and pharyngeal disease. It is somewhat difficult to give the gist of his remarks on the former variety, since the two are considered together, but I observe that he cites a number of cases of headache resulting from slight degrees of otitis media, with retraction of the drum membrane, and in most of these the ear trouble had passed unnoticed by the patient. The pain involved the temples chiefly (auriculo-temporal), but sometimes shot behind the ear; when the occiput (great occipital)

ment of the internal otitis” (Labarraque, “*Essai sur la Céphalalgia*,” p. 17). See also Von Tröltzsch, *Lehrbuch der Ohrenheilkunde*, 1881, pp. 282-3.

¹ Suné warns us against confounding such cases with the hyperæsthesia which in acute otitis media and mastoiditis, is often felt in the nucha, in conjunction with swelling of the integuments. Such hyperæsthesia, he contends, denotes a superficial condition merely, while the pain of which he speaks owns an intra-cranial origin (*Ann. des Mals. de l'Oreille*, vol. xiv., p. 174).

² *Lehrbuch*, 2 Aufl., S. 219. Quoted by Legal.

³ *Deutsches Arch. f. Klin. Med.*, B. xl., S. 201-216.

was involved, pharyngeal rather than aural trouble seemed to him to have been the cause. In every case he succeeded in detecting the temporal point of Valleix, in some instances the slightest contact with this spot bringing on the pain. Tenderness was also present between the mastoid process and the jaw, and sometimes in other regions. The headache occurred more frequently in the female than in the male sex, and was four times as common on the left as on the right side. Legal rightly insists that other factors, such as hereditary predisposition and anæmia, must combine with the aural conditions to produce the pain, but he regards the aural influence as proved by the effects of treatment, mere inflation of the middle ear (which should in all cases be adopted) being sufficient to remove the headache. He concludes by urging the physician to examine the ears in all cases of temporal (and occipital) headache exhibiting the *points douloureux*.

Other writers besides Legal, including Urbantschisch,¹ have remarked upon the fact that headache may disappear upon inflation of the middle ear. Reduction of intra-tympanic pressure may cause persistent headache, perhaps very much as a similar condition of the accessory nasal cavities may do. It is in this way that headache may arise from obstruction of the Eustachian tube, and Gradle,² while speaking of headache thus resulting in children, observes that the aural conditions may pass unnoticed if each ear is equally affected, but if one is affected more than the other the child will notice the difference.

Cephalic sensations, other than pain, may result from aural disease, as, for example, a sensation of weight and numbness in the head. Thus Morison³ writes: "Among the minor and painless, but nevertheless very disagreeable symptoms of unilateral catarrh of the outer or middle ear, is that of a sense of weight and numbness over the affected half of the head."

Aural disease may also cause tenderness of the scalp.

The following case well illustrates the necessity of carefully

¹ *Loc. cit.*

² *Journ. of Am. Med. Assoc.*, Sept. 8, 1888, p. 339.

³ *Practitioner*, vol. xxxvii., p. 174.

examining the ears in all cases of abnormal cephalic sensations:—

M. æt. 26. Highly nervous. Complained of indescribable pains in the head, but above all of a numbness and a sensation of pressure on either side “as if the head were being tightly pressed between the hands.” Both ears were found to be blocked with enormous masses of dense cerumen, which resisted all attempts at immediate removal, and could only be got away after long soaking with an alkaline solution. The lateral pressure and numbness continued in a modified form for some weeks after this, but ultimately passed off entirely.

There yet remains to be considered *Earache occurring independently of structural aural disease*—that is, *Functional earache*. (Nervöser Ohrenschmerz. Otagia tympanica. Neuralgia of the tympanic plexus.) This form is very common, as is shown by the number of people one sees daily with wool in the meatus, most of whom are suffering from functional earache. A very common cause of this disorder is dental caries or some other abnormal state of the teeth; it may also be induced by extraction of a tooth, or by disease of the tongue, epiglottis, tonsils, pharynx, naso-pharynx, and larynx. Sometimes it is hysterical; at other times it occurs as a result of exposure, but in this case it would perhaps be more properly regarded as organic.

The earache which may accompany epithelioma of the tongue is well known to surgeons, and is strikingly instanced by Hilton as an example of reflex pain. He further cites the case of a patient in whom a simple ulcer of the tongue, brought on by the fretting of a sharp tooth, was the cause of otalgia, which disappeared as soon as the ulcer had been cured by filing down the tooth. The aural pain which may accompany disease of the tonsils and pharynx, and which is aggravated by swallowing, is also familiar.¹ Gerhardt has especially insisted that violent pains in the ear almost always attend ulceration of the epiglottis.

Functional earache is much more frequent on the left than on the right side, and, as might be expected, is more common

¹ “Rest and Pain” Lond., 1880, p. 79.

in women than in men. The pain is by no means necessarily confined to the ear, but often spreads to adjacent regions.¹

¹ Literature of Functional Earache.—*Arch. f. Ohrenheilkunde*, vol. ii., p. 77; vol. iii., p. 172; vol. iv., p. 18; vol. x., p. 78; vol. xi., p. 267; vol. xvii., p. 89; vol. xviii., p. 89; vol. xix., p. 300; vol. xxii., p. 281; vol. xxiv., p. 190; vol. xxv., p. 61; vol. xxvi., p. 157; vol. xxvii., pp. 171-173; "Diseases of the Throat," etc., McBride, Edin. 1892, p. 392.

CHAPTER XII.

DISORDERS OF THE TEETH.

THAT abnormal states of the teeth may cause faceache and neuralgic pains in other parts of the head is a fact familiar to all, and has been, from the earliest days of medicine. It is not, however, so generally known that head-pain, having no apparent connection with the teeth, may have a dental origin, the pain being felt, not at the actual source of the irritation but at some distance from it, so that the patient, as Lauder Brunton epigrammatically puts it, “gets the toothache in another part of the head.”

I have not found dental irritation cited as a cause of headache by the ancient physicians, certainly not by Galen;¹ and who first specifically pointed out the connection I have been unable to discover, but it is frequently alluded to by writers of the last century. Thus J. Fordyce² (1758) writes, “Si dens exesus aut solutus alveolo vacillet, et doleat, sine mora evellendus,” recognising a morbid state of the teeth as a cause of hemicrania, although he does not advise extraction unless the tooth aches or is loose; Whytt³ (1765) remarks that the pain in toothache may affect “the cheek-bone, one side of the head, the throat, and the corresponding ear”; Stapleton⁴ (1777) observes of headache, “Si dens cariosus est, evellendus”; and F. J. Innis⁵ (1787) gives dental caries as a cause of headache.

Coming to more recent times, we find Erasmus Darwin⁶ record-

¹ A curious observation of Galen may here be referred to—namely, that the palate is apt to be high and the teeth irregular in sufferers from headache. See Kühn's edit., vol. xvii., p. 815.

² “*Historia Febris Miliaris et de Hemierania*,” Lond. 1758, p. 97.

³ “*Observations*,” etc., pp. 19, 20.

⁴ *Quid Capitis Dolor?*

⁵ “*Dissert. Med. de Hemierania*.”

⁶ *Zoonomia*, vol. i., p. 447.

ing a case of headache having a dental origin, and Labarraque¹ (1837) recommending that the teeth be carefully examined in all cases of headache. This writer quotes Fabrice de Hilden and Durwin (*sic*) to the same effect. W. Seller² (1848) and Symonds³ (1858) name dental caries as a cause of headache, and J. Dixon⁴ (1856) records a case of cephalalgia arising from the same source. S. J. Salter⁵ (1868), in a valuable paper on reflex dental neuroses, states pain in the head to be the most common of these; and as recently as 1886 Lauder Brunton⁶ has emphasised the important part played by dental irritation in the causation of headache. "Headaches," he asserts, "are usually dependent either upon the presence of decayed teeth, or of some irregularity of the eyes," and he adds, "in all cases of headache, the first thing I do is to examine the teeth."⁷ It is somewhat remarkable that after careful search among the writings of dental surgeons, I have not been able to find any reference to the subject of dental headaches.

Reflex Dental Neuroses.—In considering the disorders that may arise from abnormalities of the teeth, it is well to remember, as Salter points out, that the two lower posterior molars are situated close to the Eustachian tube and the parotid region, and that the fangs of the upper posterior teeth are close to the orbit. It should also be noted that disease in the upper teeth tends to cause reflex phenomena in the eyes and the upper part of the head generally, while disease in the lower teeth is more apt to cause trouble lower down, such as neuralgia in the neck and arms.

The most common reflex dental neuroses are: Neuralgic pains in the head, neck, and arms, in the latter sometimes accompanied by paresis, as Anstie has noticed (a fact which, among others, led him to postulate a close connection between the fifth nerve and the brachial plexus); also various

¹ "Essai sur la Céphalalgie," Paris, 1837, p. 18.

² *Monthly Jour. of Med. Scien.*, Sept. 1848, p. 138.

³ *Med. Times and Gaz.*, vol. i., 1858, p. 339.

⁴ *Atlanta Med. and Surg. Jour.*, 1856-7, vol. ii., p. 201.

⁵ *Guy's Hosp. Rep.*, vol. xiii., 1868, pp. 81-111.

⁶ "Disorders of Digestion," pp. 48, 76, 100 *et seq.*

⁷ "Disorders of Digestion," p. 48.

optic phenomena, such as temporary blindness, accommodative asthenopia (and this should be ever borne in mind in seeking the cause of this condition) dilated pupil, partial ptosis, and spasm of the orbicularis. Such affections also as twitching of the face, trismus (especially from cutting the wisdom teeth), wry-neck, functional cardiac affections (such as palpitation and cardiac irregularity, with their accompanying sensations), reflex dyspepsia (*e.g.*, vomiting), and affections of the ear (*e.g.*, tinnitus and deafness)—may one and all result from dental irritations, as may also organic disease of the ear. In all cases of otorrhœa in children, whether arising from inflammation of the middle or of the external ear, the teeth should be examined. To the foregoing list must be added laryngeal spasm, as for example the so-called “teething” cough, infantile convulsions, and true epilepsy. The fur which sometimes covers that half of the tongue corresponding to the side on which dental caries exists was thought by Hilton to be reflex in origin. It is, however, more likely, as Hutchinson observes, to have a local origin.¹

Conditions of the Teeth causing Reflex Troubles.—Among the dental causes of reflex troubles may be mentioned difficult eruption, whether primary or secondary,² the cutting of the wisdom teeth and the impaction of the permanent teeth in the jaw-bones being especially provocative of them; overcrowding of the teeth; caries, with or without exposure of the pulp; exostoses, internal (*i.e.*, nodular development of dentine into

¹ The most important writings on reflex dental neuroses are: that by Salter, already quoted; a paper by J. Lauder Brunton, *Trans. Odont. Soc.*, 1879, pp. 144-180 (including an interesting discussion), and an article by Sir J. Tomes in his “System of Dental Surgery,” 1887, pp. 564-579. This article contains a number of references. See also: Henry Power, *Trans. Odont. Soc.*, 1883, pp. 11-79 (including discussion); Sir A. Cooper, “Lectures on Principles and Pract. of Surg.,” 1824, vol. i., p. 6; Castle, *Lancet*, 1846, vol. ii., pp. 265-7; *Amer. Jour. of Med. Scien.*, Oct. 1854, p. 423; Ramskill, *Med. Times and Gaz.*, 1862, vol. ii., p. 216; *Brit. Jour. of Dent. Scien.*, vol. xxiv., p. 821, vol. xxvi., p. 28 (by Cotterell), p. 284 (by C. C. White); vol. xxxiv., p. 337 (by W. J. Collins); *Jour. of Brit. Dent. Assoc.*, vol. xii., p. 65 (by Baldwin).

For the connection between Aural and Dental Disease the following may be consulted: *Brit. Jour. of Dent. Scien.*, vol. xxiv., p. 430 (by Burnett); vol. xxiii., pp. 261, 311, 359, 418 (by Sexton), vol. xxvi., pp. 603, 668 (by Richardson).

² Wright (“Headache”) makes special allusion to the eruption of the second teeth as a cause of headache.

the pulp cavity) and external; buried fangs; unsuitable fillings; inflammation of the intra-alveolar membrane; imperfectly fitting plates. The eruption of the wisdom teeth, it has been suggested, causes pain by the elongation of the fangs and pressure of the same upon the neighbouring nerves.

Of these several sources of irritation by far the most common cause of pain outside the tooth is chronic inflammation of the pulp, and of this there is one variety which should be borne in mind in seeking for the local cause of dental headache, since it is, according to Tomes, a particularly fertile source of neuralgia. The pulp, he observes, is generally found healthy save in one limited spot which is superficially inflamed. This affection by no means necessarily causes toothache, but is capable of giving rise to "referred" pains.¹

This brings us to notice that the teeth may or may not be painful in dental headache, a fact not surprising when it is remembered that disease in one tooth, itself remaining painless, often causes pain in a perfectly sound one. Indeed, as Tomes observes, violent local toothache and dental neuralgia seldom co-exist; they tend rather to occur in inverse ratio.²

Anstie, emphasising the rarity of neuralgia as compared with dental caries, did not regard the condition of the teeth as an important factor in the production of neuralgia. Nor, because a dental neuralgia may be cured by treating the general health, must we overlook the part played by dental irritation in its causation. We shall be less inclined to do this if we remember that the affected tooth is often in such cases painless, and that there is an inverse ratio between toothache and referred dental pain. "Perfect freedom from local odontalgia, periodicity in the paroxysms of pain, amelioration, and even absolute temporary cure of the symptom under the use of quinine and the like remedies, must not be taken as indications that the disease has no local cause, and that this local cause is not likely to be a tooth."³

Baldwin points out⁴ that while the pain caused by a diseased

¹ *Op. cit.*, p. 551.

² *Op. cit.*, p. 549.

³ *Op. cit.*, p. 551.

⁴ *Jour. Brit. Dent. Assoc.*, vol. xii., p. 65.

tooth is often felt at a distance from the tooth itself and is apt to be paroxysmal, that which results from periosteal disease is invariably local and more continuous.

Method of Examining the Teeth in suspected Dental Neuroses.—It is necessary to have some definite mode of examining the teeth when dental irritation is suspected. The existence or non-existence of caries may be determined by carefully investigating the teeth by means of a mirror—a laryngeal speculum will serve the purpose—and a fine probe. The sensitiveness of cavities may be tested by means of the probe, or by syringing hot or cold water into them; or the patient may be made to rinse his mouth with hot or cold water. If a carious tooth is insensitive to these stimuli, it is dead. Another way of testing if a tooth is alive or not is to hold against it, by means of a forceps, a piece of cotton-wool which has been dipped into cold water, or to apply to it a hot steel. Or each tooth may be individually percussed with some hard substance, such as the handle of the mirror, or by getting the patient to bite upon something hard with each in succession. Much useful information may likewise be obtained by manipulating the teeth with the fingers.

Overcrowding and impaction of teeth should be sought for and the gums carefully overhauled.

Nature of Dental Headache.—As already observed, disease of the upper teeth, especially the molars, is more prone to cause headache than disease of the lower. The pain generally involves the front part of the head, notably the temples,¹ and the supra-orbital region and the globe of the eye are frequently implicated. Charles Tomes suffered from supra-orbital headache accompanied by obscure vision of one eye, which he clearly traced to some stumps in the upper jaw.² When pain is most severe in the parietal regions or the upper part of the

¹ Lauder Brunton writes: "The most frequent seat of the pain due to carious teeth is the temporal region" (*Trans. Odont. Soc.*, 1878, p. 152). In his "Disorders of Digestion," pp. 105-106, he places the headache from a decayed molar in the lower jaw in the temporal or occipital region; that from a decayed molar in the upper jaw, in the temporal region and rather more forward. Decayed incisors and eye-teeth are, he says, more likely to cause frontal or vertical headache.

² *Trans. Odont. Soc.*, 1884, p. 76.

temple, the affected tooth is generally far back in the upper jaw, but when in the eye, it may be situated anywhere in the upper jaw. If the pain is felt in the ear or the region of the temporo-maxillary joint, we must look for the source of irritation in the lower jaw, especially in the posterior molars.¹

As with headache from eye-strain, so with that from dental irritation, the pain is usually located in the front part of the head, but it may also be situated at the occiput, and even at the back of the neck and in the shoulders. Thus Blake records a case of sub-occipital pain which was cured by liberating two buried molars and extracting one carious tooth,² and J. R. Mummery tells of a young woman in whom pain in the neck and shoulders, thought to be rheumatic, was removed by extracting the four wisdom teeth, which presented considerable irregularities.³ Dental headache is more frequently unilateral than bilateral, and is not infrequently confined to a narrow area. Thus Salter describes the state of a patient who from the age of 18 to 26 suffered from pain in a spot on the left vertex about the size of a crown-piece. This pain was immediately and permanently cured by the extraction of an impacted canine. "I had an indescribable feeling," remarked this patient, "that the tooth and the headaches were connected together; when the hot throbbings came into my head, I always felt conscious of the existence of my shut-up tooth." Symonds also describes a case of circumscribed headache due to dental irritation,⁴ and Tomes⁵ records one in which pain felt in the so-called *parietal focus* was traced to caries in the second upper molar. Brunton has sometimes felt the headache and accompanying tenderness depending upon a carious tooth disappear from one part of the head and appear in another with great rapidity.⁶ Salter has known the integuments in dental headache to become not only tender but hot and red. "I have noticed this," he observes, "in my own person, when suffering from a carious upper molar tooth; the induced tenderness of the brow was such as to render any *disturbance* of the hairs of the eyebrow intensely painful." Brunton

¹ "A System of Dental Surg.," 1887, p. 555. ² *Trans. Odont. Soc.*, 1888, p. 311.

³ *Ibid.*, 1879, p. 256.

⁴ *Med. Times*, 1858, vol. i., p. 421.

⁵ *Op. cit.*, p. 543.

⁶ *Op. cit.*, p. 101.

thinks that true megrim is causally connected with dental irritation, and claims to have discovered such a connection in his own case, while Turner, in the discussion on Brunton's paper,¹ cited the case of a lady in whom "periodical attacks of intense hemicrania" were permanently removed by extraction of the left upper wisdom tooth. Tomes does not regard dental irritation as a cause of megrim; and I think we must conclude that, if it is a cause at all, it is a very subsidiary one.

¹ *Trans. Odont. Soc.*, 1879, p. 177.

CHAPTER XIII.

THE BLOOD AND HEADACHE: PLETHORA; GENERAL ANÆMIA.

HEADACHE may be associated with—

1. Superabundance or undue richness of blood: general plethora.
2. Blood impoverished in oxygen and food-stuffs: general anæmia.
3. Poisoned blood: toxæmia.
4. Local modifications in cephalic blood-supply: active or passive congestion or anæmia of the head (in connection with which subject the influence of posture comes in for consideration).
5. Increased tension in the systemic arteries.

The relation of these several conditions to headache will form the subject of the following chapters.

General Plethora.—There can be little doubt that plethora and headache may be causally associated. A tendency to plethora is constitutional to some, and the condition is increased by a luxurious and sedentary life; it may also be induced by sudden menstrual suppression. Sauvages¹ makes express allusion to the headache arising from it when

¹ This writer made three varieties of plethoric headache: *cephalalgia catamenialis*, or headache from temporary or permanent cessation of menstruation; *ceph. hæmorrhoidalis*, or headache occurring from suppression of a hæmorrhoidal flux; *ceph. gravidarum*, or headache occurring during the first three months of pregnancy, when the condition of the woman was supposed to be one of plethora. Pariset adopted a somewhat similar classification. See "Diet. des Sciences Médicales," Paris, 1873; Art. Céphalalgie. Also "De la Céphalalgie," Paris, 1847, by H. E. Cotin.

due to this latter cause, and also to the headache which may result from suppression of a habitual hæmorrhoidal flux. He in fact regarded congestion of the brain as the great cause of headache. Every physician has met with such symptoms as pain, sense of weight and fulness in the head, and giddiness, in connection with menstrual suppression, whether accidental, as from taking cold, or climacteric. The most pronounced instance of plethora I ever saw occurred in a woman of forty who had never menstruated; her face was plum-coloured, and all the vessels turgid with blood. She said she felt as if her head would burst, and indeed it looked like it. I am certain no surgeon a hundred years ago could have kept his scalpel off her, and I am equally certain that the result of its application would have been highly satisfactory.

Men who are plethoric often lose blood by a periodic hæmorrhoidal flux, and just before it occurs they are apt to suffer from a number of unpleasant symptoms, headache and other cephalic sensations among the number. With the establishment of the flux these are greatly relieved, or entirely disappear; but if the flux is suppressed they are aggravated, and this is the time, *par excellence*, for the plethoric headache in men—a headache designated by Sauvages *Cephalalgia hæmorrhoidalis*.¹

General Anæmia.—"A long and grievous headache is wont to be cured, not so much by remedies applied to, or proper for, the head, as by those which restore the *crasis* or constitution of the nervous juice, and the bloody mass; and such are chalybeats, or steel medicines, and anti-scorbutics, or medicines against the Scurvy." So wrote Willis² two and a half centuries ago, but as far back as the days of Hippocrates it was known that the composition of the blood influences the nervous system, that ancient physician speaking of it as the "moderator of the nerves," and also making special allusion to the fact that those who are pale and anæmic may suffer from headache.³ Indeed, no fact in medicine has been longer established than the connection between headache and anæmia. Neuralgic

¹ H. G. Wright has remarks on plethoric headache, "Headaches, their Causes and Cure," Lond. 1877.

² *Op. cit.* p. 109

³ "Works," trans. by F. Adams, Lond. 1849, vol. i., p. 331.

pains, which attack the head more frequently, perhaps, than any other part, are especially traceable to it, whence Romberg's dictum: Neuralgia is a prayer for blood. "Almost all anæmics," writes Colin, "suffer from frequent pains in the head," and Liveing places exhausting influences, such as prolonged lactation or whatever tends to lower the standard of health, among the causes of megrim.

It is unnecessary to enumerate the various sources of anæmia. From whatever cause arising, whether from starvation, deficiency in vegetable diet (scurvy), copious hæmorrhage, suppuration, lactation, tubercle or malignant disease, organic lesion of the kidney, liver, or supra-renal capsules; or whether it assumes one of those ill-understood forms of leucocythæmia, pernicious anæmia, or chlorosis, it may occasion the most distressing headaches.

It by no means follows that anæmic headache is entirely attributable to starvation of the nervous system. Impoverished blood almost of necessity implies vitiated blood, for the digestive glands being imperfectly nourished, digestion is apt to be incomplete, and this favours the accumulation of poisons in the intestinal tract; moreover, the various excretory organs are liable to fail. The headache of anæmia, therefore, though it may in part be due to the direct influence on the nervous system of an impoverished blood, is also due to the effect on it of a vitiated blood.

That anæmia is of itself sufficient to produce pain is proved, it might be thought, by the effect of a sudden hæmorrhage. The so-called cephalalgia puerperalis, for example, described by Baudelocque, Kyll, Berndt, and Heimbrod occurs as a result of post-partum hæmorrhage. Heimbrod records the case of a woman who on the second or third day after severe hæmorrhage was attacked by a pressing pain at the occiput and nape of the neck. The pain was continuous remitting in the morning, but increasing in the afternoon, and attaining its greatest severity at midnight. It was complicated by vertigo, dimness of vision, nausea, and other symptoms.² According to Nothnagel,³ however, headache from

¹ "Dict. Ency. des Sciences Méd.," Paris, 1873; Art. Céphalalgie, p. 36.

Med. Zeitung, Berlin, Feb. 19, 1851. "Ziemssen's "Encycl.," vol. xii., p. 26.

anæmia occurs practically only when the anæmia is of slow development, not when due to sudden hæmorrhage, and it is probable that in cases like the above there are other causes at work besides the hæmorrhage to produce the headache, so that it is doubtful whether we are justified in citing them in proof of a starved blood being competent of itself to set up pain.

Situation of the Pain in Anæmia.—Authors differ as to the most frequent site of the headache in anæmia. Thus Wilks,¹ Day,² Brunton,³ and Dana⁴ give the vertex; Cotin,⁵ Erd,⁶ Ross,⁷ the forehead and temples; while according to Hughlings Jackson⁸ it is the occiput. Eustace Smith⁹ asserts that the pain may be frontal and (sometimes) occipital; and Nothnagel¹⁰ that the entire head is generally involved in the pain.

Of my own patients suffering from headache 159 were markedly anæmic. Of these 118 were chlorotic, this large

¹ In this headache of anæmia and exhaustion, "the pain and other sensations are felt at the top of the head, and it is in this region that the patient often feels a burning or sensation of creeping, intermixed with actual pain" ("Diseases of the Nervous System," Lond. 2nd edit., p. 546). The state of things here described, though it may undoubtedly be induced by anæmia, obtains, in my experience, in cases of debility from whatever cause—above all, in women at the climacteric or suffering from menstrual irregularities. So far as the situation of the headache in anæmia pure and simple is concerned, however, the vertex, as will be seen above, is nothing like so frequently affected as the forehead.

² Day holds that anæmic headache is "vertical and not occipital, as some have contended" (*Brit. Med. Jour.*, 1878, vol. ii., p. 715).

³ Brunton contends that the headache of anæmia and debility is usually vertical and associated with flushing ("Disorders of Digestion," p. 109). This physician, like Wilks, is here probably referring to the headache of debility.

⁴ *Med. News*, March 16, 1889.

⁵ "In anæmia headache occupies chiefly the orbit, temples, and sinciput" Colin, *op. cit.*, p. 36).

⁶ Erd writes: The headache of anæmia "usually affects the temples, brow, and frequently also the vertex, extending along the sagittal suture" (Ziemssen's "Encyclop." vol. xi., p. 139).

⁷ Ross's views on the subject are identical with Erd's ("Diseases of the Nerv. System," 1883, vol. i., p. 689).

⁸ Occipital pain is chiefly due to "disorders of the circulation, and more especially to anæmia." (Hughlings Jackson in "Textbook of Medicine," J. S. Bristowe, 1887, p. 977.)

⁹ "Disease in Children," London, 1889, p. 243.

¹⁰ Ziemssen's "Encyclop." vol. xii., p. 26

proportion being perhaps due to the fact that most cases of chlorosis coming before me were specially examined with regard to this symptom. In 127 out of the 159 the frontal region was involved in the pain, either alone or in conjunction with other parts of the head. In 85 of these 127 the notes simply affirm that the "frontal" region was affected; but in some of them, other regions were probably involved also; in many, however, the forehead is expressly stated to have been the sole part affected, and in all it was certainly the part chiefly affected. In the remaining 42 cases other regions besides the forehead were painful, but in many of these again the forehead was chiefly involved. In 15 the frontal pain was associated with vertical pain, in 14 with occipital pain, while in the remaining 13 the pain was generally referred to all these regions, as in the following:—

Vertical and frontal pain; throbbing at occiput.

Vertical and frontal pain; occiput occasionally affected.

Pains all over the head (several like this).

Pains in occiput, vertex, and temples.

Pains in different parts of the head at different times;

Pains chiefly in temples; may involve the vertex and occiput.

Pain was referred to the vertex in 41 of the 159 cases, but in only 10 of these was it confined to that part. This is the more remarkable seeing how frequently anæmia produces profound neurasthenia, in which condition vertical headache is particularly common. I must here observe that I am now speaking of the situation of genuine pain, leaving other sensations, such as that of weight, entirely out of consideration. In a large number of my cases of headache occurring in anæmic patients, weight and other morbid sensations were referred to the vertex, which may in part explain why some writers regard the vertex as the usual seat of anæmic headache.

In regard to the precise area involved in the purely frontal pain it is difficult to speak with exactness, for patients can seldom accurately define it. Both the sub-frontal and mid-frontal regions were said to be affected in 5 cases, the supra-frontal region in 2, the temples in 11; from

which it would appear that the lower parts of the forehead and temples are usually most involved. We must not, however, neglect those cases in which the forehead and vertex are involved together, and in which, therefore, we should expect the supra-frontal region to be affected, but even in these the pain may be most felt in the lower frontal area. In many of these cases the frontal and temporal pain was either felt more on one side than the other, or was limited to one side. The occiput was involved in pain in 36 cases, but in only 3 of these was the pain confined to it.

It appears, then, from the foregoing analysis that the frontal region is the favourite site of the headache of anæmia. I have no doubt upon this point as regards chlorosis, but I cannot speak so positively regarding anæmia due to other causes. In explaining the frequency of frontal headache in chlorosis (and by far the majority of chlorotics suffer from it) we must remember—first, that frontal headaches are the most common of all; secondly, that the muscles of fixation and accommodation are very apt to fail in chlorosis; and finally, that dyspepsia and constipation are exceeding common in this disorder; all of which conditions—weakness of accommodation, constipation, and dyspepsia—are liable to cause frontal headache.

Other facts in regard to the situation of the headache in anæmia are brought out by a study of my cases. The pain is frequently confined to one side of the head, or is more intense on one side than the other, doubtless because it is so often neuralgic in character. The left side was more frequently affected than the right (in the proportion of 8:5). A common position for this unilateral headache is over one eye.

Nature of the Pain in Anæmic Headache.—Owing to the effect of anæmia in producing neuralgia, we are prepared to find that the headaches of anæmia are often of the neuralgic type. The following terms, mentioned in the order of frequency with which they were employed, refer to such neuralgic headaches occurring in the subjects of anæmia: “shooting,” “sharp,” “jumping,” “neuralgic,” “knife-like,” “darting,” “striking.”

These sharp pains are often, as it were, grafted upon a continuous pain, less severe in character. They are more common in the anæmia of over-nursing, leucorrhœa, and poverty, and in the more serious anæmia of organic disease than in chlorosis, though they are frequent enough in this. In the latter there is, if anything, a super-abundance of fat; in the former, emaciation is common, and it is above all upon the emaciated anæmic that violent neuralgia is apt to fasten. Rarely is such a one free from neuralgia, though occasionally pain is conspicuous by its absence.

Anæmic patients are apt to suffer a good deal from pulsation of the arteries of the head, and often the pain is associated with this pulsation. Such terms as the following, mentioned, as before, in the order of frequency with which they were employed, are used to describe anæmic headache: "throbbing," "beating," "jumping," "knocking," "banging."

The sensations which these terms are intended to express very probably differ, but they have this character in common: they synchronise with the pulse. The terms "throbbing" and "beating" are sometimes intended to designate a pulsating pain, and sometimes a pure pulsation. Such simple throbbings may be felt in some one part of the head, as in the whole of one side, in one temple, or in the crown. The terms "knocking," "jumping," "banging," probably often refer to a pain that is aggravated by each beat of the heart. Throbbing and pain may occur separately in different parts of the head, as in the following cases (all chlorotics):—

Shooting pain over the left eye, and throbbing in the top of the head.

Has frontal ache and beating inside the head.

Headache, chiefly frontal and vertical; throbbing, but no pain, at the occiput.

Frontal headache; ears throb.

Other terms used by anæmic patients to describe their headaches are: "terrible," "violent," "tearing," "gnawing,"

“dull,” “heavy;” it is sometimes said that the “top of the head appears to open and shut,” or that someone seems to be “holding the head in a vice,” or “pushing a screw into the top of the head,” or that the head feels “as if it were swollen,” or “bursting.” The occurrence of this latter sensation in the headache of anæmia is alluded to elsewhere.

CHAPTER XIV.

BLOOD AND HEADACHE (*continued*). TOXÆMIA (HETEROGENETIC).

TOXÆMIA may result from poisons introduced from without—heterogenetic, or from poisons formed within the body itself—autogenetic. The former poisons may be classified, from the point of view of our subject, under the head of certain drugs and foods, alcohol, tobacco, and substances accidentally present in the atmosphere, and these we will now consider severally, in their capacity to cause headache. It will be noticed that I exclude from the list the poisons which induce fevers, for though they are heterogenetic, the blood-poisoning in fever is probably chiefly autogenetic.

1. Drugs.—The following substances, which probably, however, constitute only a small proportion of the total number, are stated by various authorities to be capable of causing headache:—Anæsthetics, aniline, aconitine, belladonna, bisulphide of carbon, copaiba, copper, carbonic oxide, curarine, digitalis, ergot, iodine, lead, mercury, nitro-glycerine, opium, quinine, sulphuretted hydrogen, strychnine, turpentine, and veratrine. This tendency of a drug is sometimes so pronounced that headache in response to it may be counted upon with almost absolute certainty, notably in the case of quinine, iron, and opium. In many cases, however, the ill-effects of one drug may be counteracted by combining it with another. Thus Haig has pointed out that the ill-effects of opium may be neutralised by salicylate of soda; and I have also noticed that if iron is similarly combined with the salicylate, it is not only less liable to produce headache, but is more rapidly effective (so I am inclined to believe) as a hæmatinic. Again,

the ill-effects of quinine may be lessened, as Fothergill has observed, by giving it in conjunction with hydrobromic acid.

2. Foods.—Certain articles of diet undoubtedly cause headache,¹ but whether they always act indirectly by inducing indigestion, or whether their action may be sometimes directly poisonous, it is difficult to say.

3. Alcohol is a well-known source of headache. After a drunken debauch there follows a group of symptoms known in Germany by the somewhat fanciful name of Katzenjammer, and of these symptoms headache is perhaps the most prominent.² It is most apt to occur after drinking bad wine, or a variety of wines, bad, good, or indifferent. Almost every writer who has treated of headache—from Galen downwards—has referred to *cephalalgia e vino*, and doubtless in most instances actual intoxication has been implied. But it is not necessary to take alcohol in sufficient quantities to intoxicate in order to provoke headache: there are many in whom a glass of wine or beer taken at an unwonted time will cause it. Willis writes: “Sharp and thin wines, cyder, yea and Beer . . . are forbid to those troubled with headachs as so much poyson.”³ Tissot also gives wine as a cause of megrim,⁴ and more recently Haig has emphasised the part played by alcohol in the production of this and other uric acid diseases.⁵ A large number of alcoholic drinks—*e.g.*, malt liquors, cider, many wines—are acid, and as such have the effect, as Haig insists, of diminishing uric acid excretion, probably by driving the substance into the tissues. They may thus for the time being act beneficially in the uric acid variety of headache by temporarily freeing the blood of this substance; but sooner or later the uric acid thus retained within the tissues is reabsorbed into the blood, and in such large quantities, it may be, as to induce an attack of megrim. Hence

¹ There can be no doubt “that certain articles of diet occasionally act as exciting causes of the seizures, [= megrim,]” Liveing, *op. cit.*, p. 45.

² “Were the pleasures of drinking accompanied the very moment with that sick stomach and aching head, which in some men are sure to follow, I think nobody would ever let wine touch his lips.”—JOHN LOCKE.

³ *Op. cit.*

⁴ “*Traité des Nerfs*,” p. 386.

⁵ “Uric Acid,” etc., Lond. 1892, p. 149.

the wisdom of Willis' remarks just quoted. At the same time we must be careful not to attribute all the evil effects of alcoholic drinks to acidity. Pure distilled alcohol is capable of inducing very severe headache; nor is this surprising when we reflect upon the affinity of alcohol for the nerve-tissue, and upon such pronounced effects of it as neuritis. The chronic alcoholic is liable to suffer from headache, and it is often a marked symptom in connection with delirium tremens. Jenner points out that in such cases the delirium ceases before the headache begins.¹ Since chronic alcoholism tends to produce inflammatory thickening of the dura mater, Erb is inclined to refer the headache induced by alcohol to the sensory nerves of this structure.²

4. Tobacco.—Tobacco, like alcohol, has a very definite action upon the nervous system, and is often the unrecognised cause of serious nervousness. Individuals differ remarkably as regards its effect upon them. Some can smoke all day without experiencing any apparent ill-effect; others are upset by a single pipe. It is chiefly these latter who suffer from headache after smoking, more especially if alcohol be unduly indulged in at the same time. I have known the tendency to headache sensibly diminish after smoking has been given up.

5. Vitiated Atmosphere.—Adventitious constituents of the atmosphere—organic and inorganic—may induce headache, and notably such as accumulate in overcrowded and ill-ventilated rooms. Among these is, of course, an excess of CO_2 , but the organic matter exhaled from the human body is far more deleterious in its effects. The effect of heat and of a deficient supply of oxygen must also be borne in mind.³ The burning of gas is particularly conducive to headache, partly, no doubt, from the using-up of the oxygen of the air, one gas-jet consuming as much as four adults; but seeing that the CO_2

¹ *Med. Times and Gazette*, 1860, vol. ii., p. 505.

² Ziemssen's "Encyclop.," vol. xi., p. 140.

³ Haig writes: "I have very little doubt that many of the headaches which people suffer from after theatres, church, and other meetings are due to the heat and deficiency of oxygen, both of which lower the acidity of the urine, increase the alkalinity of the blood, and flood it with any uric acid that may be at hand ready to be got into solution."—*Ibid.*, p. 26.

which replaces the oxygen is probably not very effective in causing headache, it is possible that the ill-effects of gas-lit rooms are also in part due to impurities in the gas, such as sulphur, and to the heat generated in its combustion.

Ill-ventilated libraries are a fertile source of headache—to wit, that of the British Museum. The headache in this particular case is not due to gas, for the place is electro-lighted, and as the cubic space is great, we may practically exclude from consideration any effect of CO_2 . Is, then, the headache caused by exhalations from the leather-bindings of the books? This seems not unlikely. Not only does leather yield a peculiar exhalation of its own, but it is highly absorbent, and I think it probable that it rapidly absorbs body-exhalations, giving them back directly the percentage of organic matter in the atmosphere is reduced by ventilation below a certain level.¹ There are, moreover, numerous spaces above, between, and behind the books where the atmosphere stagnates, and to all the surfaces thus exposed organic matters, solid and gaseous, tend to cling and to be absorbed ready to be returned again to the air. In order to remedy this evil, means should be adopted to secure a continuous and active circulation of the atmosphere throughout the shelves. It is a disastrous fallacy to suppose that effective ventilation consists in merely *changing* the main body of the atmosphere from time to time. In the interests of hundreds who gain their livelihood—often a very poor one—by hard and wearisome literary toil, something should be done to improve the existing state of things in our great libraries. Possibly some good might result from employing different binding materials.

The headache which so often occurs the first thing in the morning is probably sometimes caused—in part at least—by imperfect ventilation of the bedroom, overcrowded as it so commonly is by bed-hangings, window-curtains, carpets, pictures, &c., and fed, as not infrequently happens, with air from impure sources; for it should further be remembered that

¹ In one large library in which a banquet had been given, I was able to detect most plainly the smell of the dinner two days afterwards, although the windows had been kept open all that time!

the atmosphere of bedrooms is during the night very largely renewed from the lower regions of the house, which are apt to be vitiated by gas, tobacco smoke, body-exhalations, and, it may even be, by sewer-gas.¹

¹ In order to ensure proper ventilation of bedrooms, carpets and hangings of every description should be dispensed with as far as possible, the windows should be kept fully open all day, and, to some extent at least, all night : no garments should be kept in the bedroom day or night, all the bedding should be exposed to a free current of air for an hour at least every day, and finally, the lower regions of the house should be freely ventilated the last thing at night by opening windows and doors.

CHAPTER XV.

BLOOD AND HEADACHE—(*continued*). AUTOGENETIC TOXÆMIA
(RENAL DISEASE).

HIPPOCRATES regarded a crisis in disease as the effort of nature to expel noxious substances, and hence laid great stress, in treatment, upon exciting the excretory organs to action; while that vast superstructure afterwards known as “the humoral pathology” rested upon the belief that certain substances formed within the body exert a pernicious influence upon it. Though this has now crumbled away, along with the old faith in the potency of “humours,” yet, doubtless, many of the symptoms of disease are due to poisons formed within the body. These autogenetic poisons are generated in the alimentary canal during the disintegration of the food-stuffs, and in the tissues as a result of their vital activities. In the former case they are known as ptomaines; in the latter, as leucomaines, uric acid, &c. The animal organism possesses an elaborate machinery for protecting itself against these poisons. It has power to render them innocuous, and power to cast them out. If there is failure in either of these processes—if, that is to say, the poisons are not properly neutralised or eliminated—they accumulate in the blood, and morbid symptoms result. Undue accumulation may also occur in consequence of excessive formation of the poisons, whether in the alimentary canal in consequence of indigestion, or in the tissues, as a result of fever, for instance. The body is able to cope with this excess within certain limits, but beyond these it is powerless, and the blood and tissues become surcharged with poison.

In the present state of our knowledge it is impossible to individualise all the various poisons produced within the body, and to specify the symptoms which they severally produce, but among the latter we may safely give headache a foremost place. The fact that it may be caused by heterogenetic poisons, especially by certain vegetable alkaloids, such as quinine and morphia, which are closely related to animal alkaloids—ptomaines and leucomaines—renders this conclusion almost certain.

Inasmuch, then, as data for an exhaustive classification of headaches due to autogenetic poisoning are not yet forthcoming, I shall content myself by considering under this head the following (although it is almost certain that many other headaches are in large measure similarly produced, such as the headaches of fever, anæmia, and dyspepsia):

Headaches resulting from :

- (1) Renal disease.
- (2) Hepatic disease.
- (3) Uric-acidæmia.
- (4) Oxaluria.
- (5) Irregularities in the quantity of sulphocyanide of potassium in the blood.

Renal Disease.—The ancients believed in a causal connection between certain states of the urine and headache. Thus, Hippocrates wrote: "Those who during fever have turbid urine like that of oxen either have or will have headache."¹ Avicenna, Sennertus, and Bonetus,² have some highly interesting remarks as to the way in which morbid urine may affect the head. They all suppose it to be so influenced by the febrile state that certain substances are separated from it, and carried away to the head. For example, it is assumed by

¹ Aphor. 70. This passage is quoted by many subsequent writers—*e.g.*, Galen (vol. xvii., B. Kühn's edit., p. 753): "Quibus per febres urinæ perturbatae sunt, quales jumentorum, iis capitis dolores adsunt aut aderunt"; Avicenna, who makes a slight modification: "Urina similis urinis asinorum significat quod soda fuit (aut sit), aut est existens, aut erit," &c. ("Canonæ Med.," Lib. iii. Fen. 1, Tract. 2, Cap. 8); Sennertus ("Opera," tom. ii., p. 531, Lug. 1650); and Bonetus ("Sepulchretum," vol. i., Lug. 1700, p. 39).

² See the references just given.

Bonetus that the heat of fever causes a distillation from the urine of certain substances which ascend to the head by the veins, and thus cause headache. He says in effect: "So greatly is the urine agitated in fever, that the humours are borne upwards to the sacred domicile of the soul, even as the winds ascend to the heavens, while the base regions below are not freed."¹

Whatever we may think of these theories, we cannot neglect the great truth which underlies them, viz., the poisonous nature of the urine.

An important observation is attributed to Avicenna and Actuarius,² to the effect that frothy urine is characteristic of headache.³ I say *important*, for unwonted frothiness of the urine often signifies albuminuria, which is apt to go along with uræmia, whereof headache is a prominent symptom.

The influence of urinary suppression in causing headache was recognised by Wepfer,⁴ and Stuckens refers to headache which may arise "a renum vitio."⁵ The relation between headache and uræmia is now universally recognised. Headache is indeed one of the, if not the, most important of the symptoms of uræmia. Sir William Roberts, after enumerating them writes: "The most common of these . . . is headache; few individuals with degenerated kidneys altogether escape it."⁶ Not only does it attend the actual seizure, but, what is of far greater importance, often precedes it, for hours, days, or, it may be, years. Thus, Dickinson writes of tubal nephritis: "The epileptic seizures sometimes come on without any premonitory sign, or they may be preceded by pain in the head,"⁷ and it is well known that severe headache often heralds the approach of

¹ "Tanta in febris tum est agitatio, ut procellæ instar ad cælum ferantur, et sacrum mentis domicilium attingant humores, inferiore regione interim non manente libera."

² "Works of Paulus Ægineta," trans. by Francis Adams, Lond. 1844, vol. i., p. 354.

³ Sennertus has a similar remark: "Bullæ parvæ per eoronam urinæ sparsæ capitis dolorem adesse signifieant," *loc. cit.*

⁴ One of his patients who had suffered from suppression of the urine complained of pain "ae si ferrum candens a caele ad eaput tunderetur et per vertice penetrare deberet": J. J. Wepfer, Scaphusii, 1727, p. 81.

⁵ "De Dolore Capitis," Brux. 1787.

⁶ "Urinary and Renal Diseases," London, 1835, p. 475.

⁷ "Diseases of the Kidney," 1875, p. 274

puerperal convulsions. In granular kidney headache may precede a definite uræmic seizure for years : thus, Bartels refers to the headache which torments the patients for years before their death,¹ and which may indeed constitute the very first evidence of the disease ;² and in another passage he warns us that “in any case of megrim occurring after middle life in an apparently robust individual, it is well to consider the possibility of its being dependent upon contracting kidneys. Neuralgic pains in the track of other nerves have, in my own experience proved far less common than headache.”³ Similarly, Murchison writes of the headache of granular kidney : “I have met with these cases so frequently that I make a point of investigating the condition of the kidneys in all cases of neuralgic headache occurring for the first time in persons of middle or advanced age.”⁴

The following case of Broadbent's is a good example of headache preceding an outbreak of uræmia :

The patient was a man, 37 years of age, who suffered from “continuous headache, with weekly exacerbations of frightful severity, at times attended with vomiting. I was at once struck by the high tension in the arteries ; the temporals were prominent and tortuous, the radial was large, full between the beats, and compressed with difficulty, and the pulse was long.” At this time the urine contained no albumen. Subsequently, however, the patient was attacked by uræmic convulsions. He suffered from “pain in the head of overwhelming severity, incoherence, stupor, intolerance of light and sound, and violent muscular jerkings. . . . The heart was beating violently, and the tension in the arteries was extremely high, the radial feeling like a solid incompressible cord.”—*Brit. Med. Jour.*, 1886, vol. ii., p. 311.

But while headache is an important symptom of uræmia, and frequently heralds the approach of the seizure, it must not be supposed that it is a necessary accompaniment of nephritis. It is, in fact, in a large number of cases conspicuous by its absence, many nephritics passing through the whole course of their disease practically free from discomfort. Even the sufferer from granular kidney may for years escape headache

¹ Ziemssen's “Encyclop.,” vol. xv., p. 476. ² *Ibid.*, p. 420.

³ *Ibid.*, p. 421.

⁴ *Lancet*, 1874, vol. i., p. 538.

and other cephalic trouble. This disease is often met with in men of great intellectual power, who retain their faculties in spite of it, and yet I believe it is a disorder that moulds the mental individual characteristically. It appears to me sometimes to confer tenacity of purpose, which probably results from an obstinacy or rigidity of thought, corresponding to the rigidity of the vascular and other tissues. I have in my mind three remarkable men who recently died from it: they strikingly resembled one another in their tenacity of purpose and in the unchangeableness of their convictions. Assuming that the disorder in each case lasted twelve years, it follows that three celebrated men were for twelve years moulding public thought, they being all this time the victims of disease. Had they not suffered from this special form, their influence would have been different: from which reflection it is at once apparent that the influence of disease on the mental individual has played a great part in the history of man.

The relation between uric acid and headache is discussed elsewhere. Now nephritis, as Haig¹ observes, is closely related to uric-acidæmia, and it may be that the headache of nephritis is related to the uric-acidæmic headache. Haig supposes that uric acid in the blood may cause nephritis; the latter still further increases uric-acidæmia, for inflammation of the kidneys diminishes its alkalinity, and the tendency of this is to interfere with the proper elimination of the uric acid by rendering it insoluble. Hence, in acute nephritis the uric acid is always held back, producing chronic uric-acidæmia and its symptoms, such as high tension, scanty urine, mental depression. In very chronic nephritis the uric-acidæmia is far less.

Now, if we grant, with Haig, that megrim is due to an excess of uric acid in the blood, nephritis ought to cause a serious aggravation of the megrim, and his view is substantiated by the fact that such is the case. "When," writes this physician, "a migraine, which has been habitual for many years of life—once in a month or oftener—suddenly becomes more frequent and severe, make quite sure that you have not to deal with the onset of nephritis; I have several times been misled in this way till I examined the urine."²

¹ "Uric acid," etc., Lond. 1892, p. 225.

² *Ibid.*, p. 82.

In regard to the frequency of headache in nephritis, it may certainly be absent in all three forms—acute, sub-acute, and granular. Of thirteen cases of these diseases in which inquiry was made regarding headache, it was absent in five, but it does not follow that it was destined never to manifest itself during their whole course.

Situation and Nature of Uræmic Headache.—A number of writers who refer to uræmic headache make no mention either of its nature or situation. There seems a preponderance of opinion in favour of the occiput being the most common situation—an opinion as old as the time of Avicenna.¹ E. C. Sequin reports two cases of occipital headache occurring in nephritis, and so severe were these that intra-cranial disease was suspected.² Roberts mentions the orbits and back of the neck as occasional seats of the pain.³ According to Bartels, the pain in granular kidney is sometimes hemicranial, and it “may extend down the neck, and even to the brachial plexus of the affected side. Such paroxysms,” he adds, “may last for several days.”⁴ Brunton, however, writes: “In albuminuria the headache may be frontal, or may be felt as a tight band surrounding the head.”⁵

I have noted the position of the headache in only seven cases of nephritis:

Acute	.	.	.	.	occipital.
Sub-acute	.	.	.	.	occipital.
Granular	.	.	.	.	occipital and nape of the neck.
Granular	.	.	.	.	frontal.
Granular	.	.	.	.	frontal.
Granular	.	.	.	.	frontal.
Sub-acute	.	.	.	.	all over.

Regarding the pathology of the headache, Bartels is inclined to attribute that variety which attends granular kidney to chronic thickening of the skull and brain-membranes. “In a

¹ “Canonæ Medicinæ,” Lib. iii., Fen. 1, Tract 2.

² *The Lond. Med. Recorder*, Nov. 15, 1880.

³ “Urinary and Renal Diseases,” Lond. 1885, p. 475.

⁴ Ziemssen’s “Encyclop.,” vol. xv., p. 420.

⁵ “Disorders of Digestion,” Lond. 1886, p. 111.

great many cases of this nature," he writes, "I have found the skullcap after death extraordinarily thick and compact, and the membranes, both the dura and the pia, also greatly thickened."¹

A brief mention may here be made of the theory advanced by Brown-Séquard as to uræmia being partly caused by the kidney failing to yield its internal secretion. This authority holds that many organs—*e.g.*, the kidneys, testes, pancreas and liver—furnish internal as well as external secretions, the former subserving some important function in the economy much as the peculiar substance or substances yielded by the thyroid gland do, and in support of this view he has shown that life may be prolonged after extirpation of the kidneys by the injection of a "renal fluid" into the tissues.²

It would thus appear that many of the phenomena which we regard as toxæmic are not merely due to a positive cause in the shape of a poisoned blood, but also, in part, to a negative cause—*i.e.*, the absence of some normal constituent. And it is possible that some toxæmic headaches may be partly thus induced. In the present state of our knowledge it is manifestly impossible to formulate a more specific statement.

¹ Ziemssen's "Encyclop.," vol. xv., pp. 475, 476.

² *Brit. Med. Jour.*, 1893, vol. i., p. 1146.

CHAPTER XVI.

BLOOD AND HEADACHE (*continued*). AUTOGENETIC TOXÆMIA (HEPATIC DISEASE).

THE physiologist has still much to teach us concerning the functions of the liver, but for the pathologist one fact stands out prominently: derangements of this organ are very apt to lead to blood-poisoning, and therefore, whatever other may be its functions, it certainly has a great deal to do with the freeing of the blood from poisons—in this respect, indeed, not standing second even to the kidneys. This is strikingly shown in (*a*) acute yellow-atrophy and in (*b*) jaundice, no matter how produced, as well as in (*c*) simple functional hepatic derangements.

a. In acute yellow-atrophy (and phosphorus poisoning) the symptoms are due to acute blood-poisoning, probably of the nature of uræmia. They are chiefly headache, delirium, coma, and hæmatemesis. Wickham Legg gives headache amongst the warnings of the disease,¹ and says it may be very violent.

b. In jaundice, when not the result of acute yellow-atrophy, there is a less degree of poisoning, the liver-cells being quite able to perform their urea-forming and other functions. The symptoms are due to bile circulating in the blood, and, in many cases, to its deficiency in, or entire absence from, the intestines, where poisons form in consequence, and thence infect the blood. According to Portal,² heat and weight of the head are often experienced in jaundice. Léon Colin gives

¹ "On the Bile, Jaundice," etc., Lond. 1880, p. 444.

² "Maladies du Foie," Paris. 1813, p. 133; quoted by Legg, *op. cit.*, p. 267.

jaundice as a cause of toxic headache,¹ and so also does Pouzol, who observes that it may be accompanied by a feeling of weight.²

c. In these two complaints (*a* and *b*) we can at once point to the liver as the organ affected, but it is liable further to many functional derangements, which, though leading to blood-poisoning, quite elude our powers of diagnosis. Murchison laid great stress upon these as a cause of headache. According to him headaches thus arising are dull, heavy, and frontal—less frequently occipital; often occurring in the subjects of lithæmia after any indiscretion or during constipation. “Their immediate cause,” he writes, “is probably the presence in the blood of some abnormal product of albumen-metamorphosis; the derangement of the liver is usually indicated by pain and fulness in the right hypochondrium, flatulence, and high-coloured urine loaded with lithates; and relief is usually afforded by mercurial and saline purges and alkaline diuretics.”³ When there are these symptoms, we have little difficulty in tracing the initial error home to the liver; but it is certain that the liver may be functionally deranged without either one or other of them being present to indicate its faulty action. This is the case, for instance, in simple defective secretion of bile, and seeing that this is probably merely an index of a much more complex derangement of hepatic function, it seems pretty evident that an individual may often suffer from subtle functional derangements of the liver which (at present at least) lie quite beyond the pale of practical diagnostics. May there not be far greater truth than we are willing to admit in the popular notion, handed down from Hippocrates’ time, that faulty action of the liver is responsible for a great deal of every-day ill health? How strangely people fluctuate in health and spirits from day to day without any discoverable cause! It is almost certain that blood-poisoning is frequently the cause, and while there is abundant

¹ “Dict. Encyc. des Scien. Méd.,” Art. Céphalalgie.

² “Essai sur l’Ictère,” Paris, 1872, p. 78; quoted by Legg, “The Bile,” etc., 1880, p. 267.

³ “Diseases of the Liver,” C. Murchison, Lond. 1885, p. 647, edited by T. Lauder Brunton.

opportunity for it to occur independently of the liver, this, as the largest gland in the body, must surely at times be the unsuspected agent. As is well known, Abernethy and his school, acting on this belief, resorted largely to blue-pill and black-draught, and although their system was certainly pushed beyond its just limits, there can be little doubt that it rests upon some physiological basis, and that it often works well. Where good results follow from it, they are, in part at least, due to the elimination from the body of large quantities of poisonous substances.

CHAPTER XVII.

BLOOD AND HEADACHE (*continued*). TOXÆMIA (URIC-ACIDÆMIA, OXALURIA, ETC.

It appears from the researches of Haig, that excess of uric-acid in the blood, or "uric-acidæmia" as it is called, is a potent cause of headache, whether of the classical megrinous type or other. Of the former Haig believes it to be an essential factor. One of its symptoms is high arterial tension which as we shall see is often closely associated with headache; it is therefore quite possible that the headache which occurs in connection with high arterial tension is due to uric-acid-æmia.

The above considerations render it necessary to enter into Haig's views at some length.¹

The proportion of uric-acid formation to the formation of urea is constant, namely as 1 : 33. If, for instance, urea production is augmented by 33 grains, that of uric acid is augmented by 1 grain; and similarly a diminution of 33 grains in urea formation causes a diminution of 1 grain in uric-acid formation.

But while formation is always in this proportion, excretion is not, owing to the fact that the uric acid may be temporarily retained in the body. When thus retained, the excretion of uric acid falls below the present production; but when, on the other hand, the stores temporarily retained are excreted, excretion is in excess of present production.

¹ What follows is more or less a digest of "Uric Acid as a Factor in the Causation of Disease," by Alex. Haig, Lond. 1892. I cannot within the limits at my disposal do full justice to the author's views, to whose work I therefore refer the reader. It is indispensable to a proper study of our subject.

The presence of uric-acidæmia is detected by observing the amount of uric acid that is being excreted, excretion being more abundant when the blood contains an excess of it than when it contains only a small proportion. We cannot always, however, form an opinion on the presence or absence of uric-acidæmia by calculating the absolute quantity of uric acid passed in the twenty-four hours. *It is necessary to calculate the proportion of its excretion to that of urea.* Thus, a daily excretion of 16 grains might occur either with or without uric-acidæmia. An individual passing 16 grains of uric acid to 528 of urea—that is to say, in the proportion of their production (1 : 33)—has under normal conditions no uric-acidæmia because the elimination of the uric acid is more or less evenly spread over the twenty-four hours. But if with the 16 grains of uric acid, he excretes only 396 of urea, this indicates that uric acid excretion is 4 grains in excess of its present production, and he therefore will probably have suffered during some part of the twenty-four hours from uric-acidæmia, seeing that these 4 grains are part of a store of uric acid previously formed, and their elimination will almost certainly not have been evenly spread over the twenty-four hours.

The ground for assuming that uric acid and urea are always formed in the proportion of 1 to 33 is briefly this: if uric-acid excretion be in less than this proportion and a drug be given to increase it, the increase will only last for a few days. This indicates that the low proportional uric-acid excretion in the first instance is due to the retention of the uric acid in the blood, and after the temporary store is eliminated, drugs fail to cause increased excretion—there being no extra production. In fact, the *plus* and *minus* excretions of uric acid, taken over a long period, tend to balance one another.

The temporary storehouses of uric acid in the body are the liver, the spleen, and the joints; all of which are less alkaline than other parts, and in which therefore the uric acid is less soluble. The sluggish circulation of plasma in the cartilages is also favourable to the deposition of uric acid in them. Injury and inflammation further tend to diminish the alkalinity in a part; hence the influence of injury to a joint in provoking an attack of gout.

The facility with which uric acid is eliminated depends entirely upon its solubility in the blood, and this again upon the reaction of the latter. The greater the alkalinity of the blood, the greater its power of dissolving the uric acid, and the more rapid its elimination; and *vice versa*.¹

Whatever diminishes the alkalinity of the blood, diminishes its solvent action on the uric acid, which then tends to be driven into the tissues; and whatever increases it, tends to cause a reabsorption of the uric acid stored away. Now it is probable that the reaction of the urine stands in constant ratio to that of the blood. When the urine is alkaline, the alkalinity of the blood is high; when it is very acid, the blood alkalinity is low.² Therefore an alkaline urine goes along with a free excretion of uric acid, and a highly acid urine with a scanty excretion of it. "Speaking generally, . . . it may be said that the excretion of uric acid from day to day and hour to hour is inversely as the acidity of the urine," from which it follows that substances which diminish acidity of the urine, such as the alkalies, increase the elimination of uric acid;³ while those which increase acidity, check its excretion.⁴ Foremost among the latter are the acids. Now all beers, cider, and most wines, are acid; hence they cause retention of uric acid, and, as a consequence, are hurtful in gout and allied conditions.

Among the circumstances tending to influence the reaction

¹ Haig observes that this rule probably always holds good under normal physiological conditions, but that there are certain pathological states under which it does not. There may, for instance, be chronic uric-acidæmia in nephritis without any corresponding excess of uric acid in the urine.

² Haig suggests that the reaction of the kidneys may influence the quantity of uric acid eliminated by these organs.

³ Other substances which increase the elimination of uric acid are: Salicylate (which forms a soluble salicylurate), and phosphates of soda, and quinine. The action of these drugs will be considered in the section on treatment.

⁴ It must not be thought, however, that only those drugs which diminish the alkalinity of the blood check uric-acid excretion. All those substances which form insoluble compounds with uric acid in the blood tend to do this, among them acids, iron, lead, lithia, manganese, calcium, chlorides, opium, mercury, antipyrine, caffeine, the nitrites, some hypophosphites, and strychnine.

of the urine, and therefore the elimination of uric acid, are the following:—

1. Time of day has a decided influence. "The acidity of the urine is high in the early morning hours, gradually falling towards 6 A.M. It is low after that, reaching a minimum about 9 or 10 A.M., and then rising slowly till 2.30 or 3 P.M., when it again falls to a second minimum, about 6 P.M., after which it rises to its night maximum." There is, therefore, one great acid tide in the night, and there are two alkaline tides, a major one in the morning, and a minor one in the afternoon. It follows that there is least uric acid in the blood during the acid tide of night, and most during the morning alkaline tide, when what was held back during the night is eliminated.

2. There is a fairly constant relation between the amount of urea produced and the acidity of the urine. Whatever raises the amount of urea, raises acidity. Urea-production depends chiefly upon the amount of nitrogenous food taken, increasing with it. Thus, a highly nitrogenous diet, such as one containing a large quantity of meat, favours acidity, and consequently tends to check uric-acid elimination.

3. A vegetable diet has the opposite effect, tending to diminish the acidity of the urine and to favour the excretion of uric acid.

4. The acidity of the urine varies inversely with perspiration. Profuse perspiration goes along with a low degree of acidity.¹ Hence those following laborious occupations, in which the action of the skin is kept up, tend to have low acidity and to eliminate the uric acid as it is formed, while the reverse is the case with those of sedentary habits. Owing to the action of cold on the skin preventing perspiration uric acid tends to be stored up during the winter. When the warm weather comes the supply thus accumulated is reabsorbed into the blood. Hence uric-acidæmia often prevails in spring and early summer; similarly, the atmosphere of a heated room, by promoting the action of the sweat-glands, causes temporary uric-acidæmia.

¹ Haig suggests that this is due to the large quantity of acid lost in the sweat, but according to Landois and Sterling, this excretion is alkaline in the first instance, only becoming acid after excretion from acid fermentation.

5. Deficient oxidation lowers the acidity of the urine, and thus tends to produce uric-acidæmia.¹

6. Acidity is increased in fever unless there be dyspnœa, which leads to deficient oxidation.

Symptoms of Uric-acidæmia.—Excess of uric acid in the blood produces a characteristic group of symptoms which depend very largely upon its influence on the vaso-motor system. It appears that uric acid has the power of contracting the arterioles, in consequence of which the resistance to the action of the heart is increased, arterial tension rises, and the heart-beat becomes slower. There is often, moreover, a tendency to cold hands and feet, or, it may be, to general chilliness. "Dead hands" and Raynaud's disease are assumed to result from the vaso-motor influence of the uric-acid in the blood,² as are epilepsy and megrim from its action on certain vaso-motor areas of the head, and glycosuria from the constriction of all the systemic arteries, save those of the liver, which hence becomes hyperæmic. It is further believed that widespread nutritive changes in the skin and other textures may be brought about in a similar way.

With the high arterial tension and the slow pulse there is less urine (owing to constriction of the renal arterioles), this fluid having a low acidity, and containing a relatively large quantity of uric acid. Finally, and what most concerns our present inquiry, there is a tendency to headache and mental depression.

These various symptoms of uric-acidæmia may often be observed during the morning alkaline tide, or after giving alkalies or other drugs tending to draw the uric acid out of its storehouses; they may also be noticed in spring-time; during the rebound which succeeds the administration of drugs which

¹ Haig suggests that the headache which is wont to be set up in theatres, churches, etc., is due to uric-acidæmia brought about by increased action of the skin and defective oxidation, both of which lower acidity.

² Haig groups "dead hands" and Raynaud's disease together, regarding the one as a minor degree of the other, and Goodhart holds the same view. I have little doubt of its correctness. I have taken notes of over two hundred cases of "dead hands," and have observed every gradation between temporary numbness and genuine Raynaud's disease. The affection known as "dead hands" is exceedingly common among nervous women.

drive the uric acid into the tissues, when the uric acid is again dissolved out into the blood; and during the similar rebound which occurs during convalescence from fevers.

The absence of uric acid from the blood produces a contrary set of symptoms. Blood-tension is low, the flow of urine free,¹ there is immunity from headache and other abnormal cephalic sensations, and in their place a sense of well-being.

One of the most important results of Haig's observations on uric acid and its effects, is the association which he establishes between megrim and uric-acidæmia. He has shown that for some days preceding the attack the excretion of uric acid falls below the standard proportion, which is evidence that it is being held back in the body; while during the seizure it rises above the normal proportion, owing to the elimination of the uric acid previously retained. The deficient excretion before the attack corresponds with a deficiency of it in the blood and with a feeling of well-being; while the excessive excretion of it during the attack corresponds to an excess of it in the blood—to uric-acidæmia. The symptoms of megrim are, it is at once apparent, very largely those which have been given as symptoms of uric-acidæmia. Thus there is headache, and generally the pulse is slow and of high tension; the excretion of urine (and of the saliva) is small, owing to arterial constriction, and for the same reason there is often great chilliness, especially of the hands and feet.

The headache is attributed to colic of certain cephalic vessels—and the aphasia to spasm of the arteries belonging to structures subserving speech.

Uric-acidæmia does not produce megrim in every one; there must be predisposition to it in the shape of certain local imperfections in nervous organisation.² But given such pre-

¹ Haig regards the passing of a large quantity of water during the night as evidence of high arterial tension during the day. During the alkaline tide of day the arterioles of the kidney are tightly constricted, and the water consequently retained within the body; whilst during the acid tide of night a relaxation of the arterioles takes place, the water retained during the day being eliminated.

² That uric-acidæmia alone is not competent to produce the seizure is shown by the fact that the tendency to megrim is often practically overcome

disposition, an attack may be excited at will by inducing uric-acidæmia—namely, by first driving the uric acid into the tissues by means of an acid, opium, or other drug; and then, after a sufficient quantity has accumulated in them, by giving a uric acid solvent.

Morning headaches are probably often due to the uric-acidæmia of the morning alkaline tide, though other factors may co-operate in their production.¹

So much for the relation between uric-acidæmia and headache. It remains to be added that, according to Haig, gout, rheumatism, and rheumatoid arthritis are related to one another, in that all are due to the deposition of uric acid in the affected joints. This has an important bearing upon our subject, because, as we shall see, headache stands in definite relation to all these, and it is possible that Haig's view explains that relation.

Haig holds that the conditions in gout, especially the local articular conditions, tend to a permanent retention of the uric acid in the joints when once deposited; that those of rheumatism tend to cause a deposition of it in the joints from time to time only, and only temporarily; while in rheumatoid arthritis the conditions favour a constant deposition of it there, and as constant a removal of it; so that in gout much uric acid is found in the affected joints, in rheumatism none, the joints having undergone little or no structural change, while in rheumatoid arthritis no uric acid is found, but marked disorganisation is observed.

Oxaluria.—Under certain circumstances the urine deposits

by correcting a serious error of refraction; and conversely, that an error of refraction is not the essential cause, as some would have us believe, is proved by the fact that megrim may be cured by a plan of treatment which aims at removing the uric-acidæmia without paying attention to any refractive error that may be present.

¹ The group of symptoms above enumerated as characteristic of uric-acidæmia are almost certainly connected together by some bond of causation, but whether they are all due to an excess of uric acid in the blood is a matter on which I do not think we can at present dogmatise. It does not appear to me to be altogether impossible that there may be other substances in the blood of a poisonous nature, the quantity of which rises and falls with that of the uric acid.

an abundance of oxalate of lime crystals. At the same time headache, irritability, pain in the back, and other symptoms may be observed, and these have been thought to be due to an excess of oxalates in the blood. This, however, is highly doubtful, for in the first place the same train of symptoms is observed in other conditions; then again the deposit may occur—though I think rarely—without the said symptoms; and finally, it has been shown that the deposition of oxalate in the urine depends upon the inability of the latter to hold it in retention rather than upon its presence in excessive quantities. Nevertheless this inability generally signifies a pathological condition, and therefore should always receive our attention. It occurs especially in those who are large meat-eaters, and who at the same time lead inactive lives.¹

Conditions of Blood Associated with Excess and Deficiency of Sulphocyanide of Potassium in the Saliva.—Samuel Fenwick claims to have shown that certain disorders are associated with an excess of sulphocyanide of potassium in the saliva, and therefore, presumably, in the blood—at all events, with some peculiarity of blood composition. “Bilious Headache” is one of the most common of these, occurring in one-fourth of Fenwick’s private cases exhibiting excess of the sulphocyanide, (the patients usually belonged to gouty or rheumatic families), whereas it was only present in one-tenth of those cases exhibiting a deficiency, the headaches in the latter instance being, according to Fenwick, not related to gout, but rather neuralgic in nature. His method of treating the former has for its object the diminution of the sulphocyanide of potassium. This may be done by putting the patient on a long course of aperients, especially salines, calomel, and podophyllin; alcohol should be given up, the quantity of nitrogenous diet cut down, and soups and fatty materials² strictly forbidden—a plan of treatment, it will be observed, very much the same as that which is adopted for uric-acidæmia.

¹ Sequin observes that a generally recognised cause of headache “is that condition of the system in which oxalate of lime appears abundantly and frequently in the urine, and in which uric acid quickly separates from it—in brief, acidity or a gouty disposition” (*The Med. Record*, New York, Dec. 1, 1877).

² See *Lancet*, 1887, vol. i. pp. 1271–1274.

The method of ascertaining the quantity of sulphocyanide in the saliva is so laborious, and to the inexperienced so inexact, that it is not likely to be of much service in every-day practice.

Before dismissing the subject of autogenetic toxæmia in relation to headache, I would draw attention to what I believe to be an important factor, namely, the influence of idiosyncrasy. A recognition of its importance appears to me to clear up many points otherwise difficult of explanation.

It is undisputed that individuals differ considerably in regard to their response to heterogenic poisons. This is well illustrated in the case of the vegetable alkaloids, such as morphia and strychnine, which chemically are closely allied to the animal alkaloids—the ptomaines and leucomaines produced within the body. Thus, a dose of morphine, which has no appreciable effect upon one person will make another distinctly drowsy. But in considering the influence of autogenetic poisons, we are apt to leave out of account this element of personal susceptibility. It is true that we do not yet know what is the exact nature of uræmic poisons; but, this apart, I am convinced that individuals differ very greatly in regard to their susceptibility to them, and that a quantity that would have no appreciable effect upon one will stupefy or convulse another. Even among those who are highly susceptible to their influence we find considerable difference in regard to the mode of response. Thus, I have seen a patient with scarlatinal nephritis, whose kidneys were getting rid of the nitrogenous excreta fairly well, become suddenly comatose and convulsed on one half of the face and in the corresponding arm, the latter hanging helpless by the side for some time after the attack; while, on the other hand, it is not unusual to see cases of suppression in which signs of uræmia are conspicuous by their absence. Now I do not say that this factor of idiosyncrasy in regard to poisons completely explains these cases, but I do say that its influence must be taken into account. It would appear, in the case of the patient just alluded to, that not only were his supreme cortical centres highly susceptible to the action of the poison, as evidenced by the readiness with which he became comatose, but that this

susceptibility was shared in a peculiar way by a limited group of motor (kinaesthetic?) centres.

Again, take the case of uric-acidæmia. Who can doubt that all are not equally susceptible to its influence? There must be a large number of persons who repeatedly suffer from a marked degree of morning uric-acidæmia, and who, though they may possibly have high arterial tension and ischuria, yet are clear-headed and altogether free from morbid cephalic sensations.

A recognition of this element of personal susceptibility enables us to explain how it is that some persons will suffer for years from dyspepsia without experiencing any unpleasant head-symptoms, while a slight attack will render others irritable, desponding, and stupid;¹ that some, victimised for years by granular kidney or gout and thus exposed to constant blood poisoning, enjoy complete immunity from head-troubles, while others continually complain of them.

I am acquainted with an individual who displays an idiosyncrasy in regard to alcohol and tobacco. Half a glass of beer clouds his intellect, while a small pipe of mild tobacco utterly incapacitates him. Even a very slight degree of uric-acidæmia has a marked influence on this patient, not only tightening the arteries, but obscuring the intellect and causing headache, and very much the same cephalic effects occur when the motions are not properly stained with bile. We have here apparently a case manifesting a susceptibility to a variety of poisons.

A few words on the effect of habituation. It may be argued that just as an individual may become habituated to alcohol and tobacco, so also may he to poisons produced within the body, and doubtless there is a great deal of force in such an argument; but while habituation may diminish susceptibility, it cannot remove it, just as no amount of smoking or drinking will render some tolerant of tobacco and alcohol, even in small quantities.

¹ I do not overlook the fact that the *nature* of the dyspepsia, by influencing the kind of poisons found, may influence also the cephalic effects; but we are surely not warranted in supposing that all the differences in these cephalic effects are due to differences in the kind of poisons, and none to differences in regard to susceptibility to them. (For the sake of clearness I am assuming that the cephalic effects of dyspepsia are rarely toxæmic, and not due to afferent nerve-impulses.)

CHAPTER XVIII.

BLOOD AND HEADACHE (*continued*).—LOCAL MODIFICATIONS IN THE CEPHALIC BLOOD-SUPPLY.

HEADACHE from local plethora has been described by many writers, but for the most part vaguely, as “headache from congestion” or from “hyperæmia.” Such local modifications in the blood-supply have, since the discovery of the vaso-motor system, been held responsible, not for headache alone, but for all sorts of nervous symptoms, the popularity of explanations based on a theory of vaso-motor changes being due to their simplicity, and to our almost complete inability to put them to the test.¹

One of the most noted writers of the last century—Sauvages—regarded congestion of the brain as the great cause of headache, and the same view has been held within comparatively recent times. Bennett, for example, wrote: “It is probable that every species of headache, except the organic, depends upon a greater or less degree of congestion of the vessels of the brain.”² It was not, however, suggested how this local congestion is brought about. Physicians at this period distinguished between active and passive congestion. Thus Colin³ divides “congestive” headaches into those due to general plethora; those caused by passive congestion, as by “a too tight cravat or corset,” or by heart-disease; and those

¹ For a historical account of this subject the reader is referred to Liveing's work on “Megrim,” etc., Lond. 1873, pp. 273-335.

² “Library of Medicine,” vol. vii. p. 155.

³ “De la Céphalalgie,” Paris, 1847.

due to active congestion. It was more especially in respect to the latter variety that no explanation was forthcoming. There was said to be "a determination of blood to the head," but, as Liveing points out, the investigator was continually confronted with the difficulty of explaining this determination. Colin suggested as causes too thick or too tight hair; violent bodily exercise, as running, laughter, coughing, vomiting, defæcation; violent emotions, such as intense anger, grief, or shame, and excessive intellectual toil. All these may certainly set up headache, and no doubt in some of them there is a determination of blood to the head, but no suggestion was made as to the mechanism whereby such determination is effected.

Marshall Hall, who attributed megrim and other nervous seizures to this cause, tried to account for the congestion by supposing a contraction of the muscles of either (1) the neck, whereby the large veins of the neck were compressed, or, (2) the glottis, producing dyspnœa and so cerebral congestion. In this way he thought to explain the production of nerve-storms by peripheral irritation, in accordance with his doctrine of reflex action.¹ But with the discovery of the vaso-motor system, with the knowledge that the blood-supply to the head can be regulated by means of impulses ascending the cervical sympathetic, medical ingenuity for a time exhausted itself in theories of local congestion and anæmia—or as they now came to be termed, the vaso-motor theories—as explanations of nervous disorders. Nor was this unnatural, for by means of the vaso-motor system the blood-supply to various parts of the nervous system can be regulated with great nicety, and the environment of individual ganglion-cells being thus modified, their functions can in this way be influenced.

Nevertheless, more recently many English pathologists have come to look upon these vaso-motor theories with great suspicion. As regards megrim the following considerations may be urged against them:

1. In the first place the manifest vaso-motor changes are by no means constant: there is, in fact, great variety. Thus in Du Bois-Reymond's case, there was blanching of the affected side and

¹ See on this subject Liveing, *opus cit.*, p. 283 *et seq.*

dilatation of the pupil, evidently from over-action of the cervical sympathetic ; and this it was which led him to conclude that, in his case at all events, the vaso-motor spasm stood in causal relation to the seizure. (This form is known on the Continent as *hemicrania sympathetico-tonica*.) Möllendorff, on the other hand, observed vascular dilatation on the affected side, and he attributed the seizure to this. (This variety has been termed on the Continent *hemicrania sympathetico-paralytica*.) Lauder Brunton, from observations on himself, contends that there is both dilatation and constriction of the vessels in the same subject—that they are constricted towards their peripheries but dilated on the proximal side of the constricted portions.¹ So far as my own experience goes, the patient is usually blanched on both sides of the face during the seizure, and with such conflicting data we may, I think, safely conclude that the vaso-motor state is not constant during it. “In fact,” writes Liveing, “when we come to compare the various observations which have at different times been made on the state of the circulation during the paroxysms of megrim, we become convinced that these ‘vaso-motor’ symptoms are among the most variable and inconstant of all the phenomena of the seizure ; and consequently, interpret them as we will, they cannot safely be regarded as the cause of the rest—at least of the pain and other leading features of the attacks.”² In short, he regards the “derangement of the circulation as one among many phenomena of the paroxysm, and by no means as essential or the cause of the rest.”³

2. A second argument against the theory that vaso-motor changes are the source of the essential phenomena of megrim lies in its analogy to epilepsy.⁴ There are few authorities prepared at the present time to defend the theory that the epileptic fit is dependent upon a vaso-motor nerve-storm. We know that the epileptic aura may consist of an idea—of a highly specialised mental state, having a correspondingly complex nervous basis, and it is exceedingly improbable that

¹ “Disorders of Digestion,” Lond. 1886, p. 103. For Du Bois-Reymond’s, Möllendorff’s, and Latham’s theories, see Liveings’ work, *op. cit.*, p. 295 *et seq.*

² *Ibid.* p. 303.

³ *Ibid.* p. 317.

⁴ This analogy is denied by Wilks.

a highly specialised discharge can be excited by a modification in the circulation, or tension, of the plasma environing the cortical ganglion-cells. Surely the chief responsibility of the fit must rest with the discharging cells themselves? All analogy forbids us to assume that so simple a modification in the environment of a ganglion-cell as alteration in the plasma can produce so specialised a result as an epileptic fit. A mere disordered and chaotic array of symptoms—such as convulsions—it might produce, but nothing more. If we want to shift the responsibility of the discharge upon the plasmic environment of the cells, we shall have to assume that it is of a highly specialised nature, in place of being, as it is, comparatively homogeneous from the beginning to the end of the seizure. Seeing, then, that we are compelled to regard the epileptic fit as beginning independently of vaso-motor action, why not also megrim, its near relative?

3. Finally, it may be asked: Granting, for argument's sake, that the attack begins in the vaso-motor system, what determines this erratic action of vaso-motor centres? It is as difficult to explain a discharge beginning in a vaso-motor centre as one beginning in any other nerve-centre, and we get therefore no nearer the initial cause of the storm by the one theory than by the other.¹

While, with Liveing and Gowers, I regard the vaso-motor phenomena of megrim as secondary, I think it possible that they may be, in part at least, responsible for the pain. Du Bois-Reymond attributed the pain to arterial colic—*i.e.*, to pressure on the arterial nerves, caused by violent vascular spasm; while Brunton holds that it is due to the blood being driven with great force against a constricted part of the vessel. I have little doubt that the pain of megrim may in part be seated in the arteries; and the like is possibly true of some non-megrinous headaches.

¹ See on this subject "Diseases of the Nervous System," Lond. 1888, vol. ii., p. 788, *et seq.*, by W. R. Gowers. It should be mentioned that so high an authority as Broadbent believes that vaso-motor changes may lead to very definite and complex results by affecting various cephalic areas. Haig is of the same opinion, and he attributes the attack of megrim to the action of uric acid on the vaso-motor system.

I may here briefly allude to a vascular condition which I have noticed in some sufferers from megrim, and which has not, so far as I know, been pointed out. Though, as I have said, I have usually found the face blanched during the seizure, the temporal arteries as a rule throb violently, and especially on one side if the pain is entirely or chiefly unilateral, the effect being that the temporal artery of that side is permanently distended and rendered unduly tortuous. In several cases of chronic non-megrinous unilateral headache also—for unilateral headaches are not necessarily megrinous—I have observed a like asymmetry of the temporals.¹

We have now to ask whether modifications in the quantity of blood sent to the head—*i.e.*, local congestion and anæmia—are capable of causing non-megrinous headache. It is well to bear in mind that, on the assumption that the pain in inorganic headache is situated in the extra-cerebral structures, such modifications must involve these structures essentially, in order to produce the pain. I lay particular stress upon this, because one might, when reading of “congestive” and “anæmic” headaches, think of the vascular changes as involving the structures within the skull, and notably the brain itself, which is almost certainly not the seat of the pain.

We may consider the influence of modifications of cephalic blood-supply under the following heads:—1. Passive congestion. 2. Active congestion. 3. Anæmia.

1. Passive Congestion of the Head.—Apart from structural disease of the heart and lungs, passive congestion of the cephalic vessels may be produced by coughing, vomiting, blowing the nose, blowing wind instruments, or indeed by any muscular effort involving the trunk; also by constrictions round the neck.²

It rarely happens that mere congestion, active or passive, of

¹ One cannot but ask, What would be the effect of a similar state of things occurring in the brain? If one temporal may become much more tortuous and distended than its fellow owing to erratic vaso-motor influence, why not one particular artery of the brain? Have we here a clue to some cases of hæmorrhage into the brain?

² The influence of coughing, vomiting, etc., on headache is considered more particularly in chapter iii. part ii.

a part otherwise healthy, is sufficient to cause pain :¹ some other cause is generally at work. Thus, the act of stooping may at one time produce no effect, and at another violent headache, showing that the congestion alone is insufficient to cause it. Similarly, the act of coughing is sometimes accompanied by great pain in the head, and sometimes by none at all—the pain when it does occur being probably partly due to jar, but chiefly to the temporary congestion of extra-cerebral structures. Now even when coughing does produce headache, it is generally only in a limited region—*e.g.*, the forehead, temples, or a localised spot on one side of the head—that is, places of “least resistance ;” whereas if the congestion alone caused the pain, all parts of the head would be painful during the cough.

2. Active Congestion (“Determination of blood to the head”).—This may occur in violent emotions, and is brought about through the vaso-motor system. In fevers there may be violent pulsation of the cephalic vessels, but the blood is probably not sent more abundantly to the head than to other parts. The remarks made on passive congestion apply also here. If the tendency to headache is very great, then active congestion may bring it out ; or it may aggravate previously existing pain, but it cannot by itself originate it.

These considerations make it very evident that there is little or no justification for describing congestive or hyperæmic headache as a special variety.²

3. Anæmia.—Eulenburg thinks that temporary anæmia (as

¹ As an instance of congestion alone causing pain, we may take passive congestion of the liver, which in extreme cases leads to well marked pain.

² Symonds, who regarded the brain as the seat of pain in headache, found an argument against the extensive application of the congestion theory to headache in the fact insisted upon by Heberden, that a person may suffer all his life, on and off, from headache without the slightest impairment of his faculties. If, he argued, congestion is so frequent a cause of headache as is generally supposed, surely deterioration of brain tissue would result in course of time (“Gulst. Lect.,” *Med. Times and Gaz.*, 1858, April 17.) He might have advanced a yet more forcible argument : Granting that cerebral congestion is the great cause of headache, how comes the disordered circulation to manifest itself chiefly or solely in pain ? A universal hyperæmia of the brain, capable of causing it to ache, would surely be competent to disorder its entire functions.

well as hyperæmia) may irritate sensory nerves, whether in the skin, pericranium, meninges, or “the sensitive regions of the brain itself.”¹ Facts supporting this conclusion are, however, meagre. Pilz collected a large number of cases of ligature of the carotid, but in only 19 of them did headache supervene at once upon ligature,² and in many of these it is probable that the headache was of the kind that might follow upon any operation done under an anæsthetic.

¹ Ziemssen's “Encyc.,” vol. xiv. p. 20.

² Nothnagel, *ibid.*, vol. xii. p. 26.

CHAPTER XIX.

BLOOD AND HEADACHE—(*continued*). THE EFFECTS OF POSTURE.

SEEING that posture influences headache largely by its effect upon the cephalic circulation, it may conveniently be considered here. Man is one of the few mammals holding the head erect. His assumption of the erect position took place very gradually through many generations, and it involved a parallel modification of the entire vaso-motor system, in order to secure the proper supply of blood to the head however the posture might be varied and with whatever degree of suddenness. So nicely have matters come to be adjusted that the circulation in all parts of the body now tends to remain constant, whatever the posture assumed, and it is probable that, under normal conditions, posture (if we except the influence of stooping) affects the circulation of the head as little as that of any other part; from which it would appear that *under normal conditions of the vaso-motor system* it does not greatly influence headache through the circulation.

It is not difficult to conjecture how this adjustment is maintained. In the upright posture the heart, in pumping the blood to the head, acts against the force of gravity, whilst in the horizontal position the influence of that force tells with considerably less effect in impeding the flow, and we may therefore reasonably assume that in the latter case the effect of diminished gravity is neutralised by a constriction of the cephalic arteries,¹ by means of which (in conjunction it may be

¹ The quantity of blood going to the head may be even less in the horizontal than in the erect posture. This may be argued from the ascertained effects of sleep. Mosso has constructed a couch which rotates on a transverse

with other vaso-motor changes) the capillary blood-pressure in the head is maintained at the same level during sitting, lying, standing, or the transition from one attitude to another.

Now, seeing that this adaptation of the vaso-motor system to man's new condition is a comparatively recent acquisition in his philogenesis, and that the latest acquisitions are the most apt to be involved in disease, it is not surprising to find an occasional hitch in the adjustment of the vaso-motor system, in consequence of which it does not always respond at once to change, of posture. Thus if the cephalic arteries fail to contract properly on the horizontal posture being assumed, the head will be unduly flushed with blood; and again, if on reverting to the erect position they fail to dilate, the head will receive an insufficient supply. When, therefore, the vaso-motor system is out of gear, change of position—otherwise powerless or nearly so—to influence headache, may by its effect upon the cephalic circulation become very potent. It may even, supposing the disposition to the headache at the time to be very great, initiate the pain, while if the pain already exists, it may modify it for better or worse—a fact for which we are prepared when we reflect that the vaso-motor system is often disturbed in headache. In one variety of *megrim*, for instance, there is dilatation of the cephalic blood-vessels, with contraction of those belonging to the trunk and limbs, so that the head is flushed with blood. The effect of the horizontal posture in such a case is still further to aggravate the evil, for the condition of the vaso-motor system which has led to the undue dilatation of the cephalic blood-vessels is incompatible with proper adjustment.

Under normal conditions the effects of posture on the cephalic circulation are best seen in stooping, when the head swells from vascular distension. Headache is practically always aggravated by this attitude, though there are some rare cases in which the pain is relieved by keeping the head

axis, and which may be so balanced as to remain perfectly horizontal when a person lies down upon it and remains awake. As he falls asleep the head ascends while the legs descend, proving irrefragably that the former has become lighter from a diminution of its blood-supply; and we may reasonably assume that it is then decidedly lighter than in the erect posture.

slightly below the level of the rest of the body. Naturally the ill-effects of stooping are very pronounced in the plethoric. Thus it brought on severe headache in one of my patients suffering from plethora and menstrual suppression. I find, however, that its ill-effects are almost, if not quite, as marked in the anæmic, in whom stooping, in addition to aggravating the headache greatly, causes violent throbbing in the head, this being doubtless due to the erratic vaso-motor action which prevails in anæmia. Not only may stooping aggravate, it may even initiate headache: any occupation involving stooping—*e.g.*, gardening—is apt to set up headache in those unaccustomed to it. Thus, if a person leading a sedentary life is advised to take more exercise, and in consequence suddenly takes up gardening, he will probably do himself far more harm than good by the constant stooping which it entails. The vaso-motor system requires to be gradually and carefully educated to the new order of things before such an occupation can be followed with any benefit.

It is well known that vertigo and tinnitus are common results of stooping, more especially if that posture be suddenly exchanged for the erect; similarly, the sudden assumption of the erect posture after lying down may induce headache—particularly if the individual has just been awakened from a sound sleep. Stooping may cause other effects. Thus, in one patient it induced “soreness on the side of the head,” in another a feeling “as if the front of the head would fall off.”

The relative influences of the horizontal and erect postures upon headache may now be discussed. Sometimes the pain is unaffected by either, but they often have a decided influence upon it, the horizontal posture generally tending to relieve the pain, chiefly, in all probability, by the rest which it entails, and not, as I shall show, by increasing the amount of blood in the head. In considering its influence it is most important to distinguish carefully between “the act of lying down” and “the horizontal posture.” The former, as Liveing observes, generally aggravates for a time the pain of megrim,¹ and the like is also true, in my experience, of other headaches. This-

¹ *Op. cit.*, p. 322.

increase of pain may last for some time after lying down; one patient complained that the "headache was worse for a quarter of an hour after." The muscular effort involved in the act probably causes the aggravation of the pain, while its continuance in this intensified form for some time afterwards is probably due to a temporary disturbance in the cephalic circulation occasioned by the alteration of posture and requiring time to right itself.

Headaches which are relieved by lying down may for convenience be divided into—*a*, the non-megrinous, and *b*, the megrinous. *a*. Of the first class—judging from my notes—for every two that are benefited by a reclining posture one is made worse, but this is almost certainly not the right proportion, and I merely cite the figures in order to emphasise the fact that a considerable number of non-megrinous headaches are made worse by the horizontal posture. Many authors have assumed that anæmic headaches are due to a scanty supply of blood to the head, and are therefore necessarily benefited by lying down; indeed, some would even go so far as to make this a test whether the pain arises from anæmia or not. I know, however, no ground for assuming that headache ever results from a deficient blood-supply, and as chlorotic and anæmic patients complain more frequently of "throbbing" and "knocking" in the head than any other class, they probably suffer from too much blood there rather than from too little. But headache often arises from impoverished blood, and this is no doubt the cause of the pain in anæmia. While, however, in many of these cases relief is obtained by lying down, in some I have known the pain to be actually increased. These considerations render the conclusion that the horizontal posture benefits by increasing the cephalic blood-supply highly unlikely, more especially when to them is added the further fact that the headache of anæemics, as of others, is aggravated by stooping, coughing, or any circumstance tending notably to increase the cephalic blood-pressure. In non-megrinous headaches, whether the patient be anæmic or otherwise, the horizontal posture probably affords relief by securing the completest rest possible, a conclusion that is further suggested by such cases as the following :

Must lie down with headache ; obtains most relief by maintaining the head in one position and not moving.

Feels easier lying down ; the attack comes on directly the foot is put to the ground.

The pain goes away on lying down but starts again directly she begins to stir about.

It is not always a matter of indifference, in regard to the alleviation of the pain, whether the patient lies prone, supine, or on the side :

Chlorotic.—The pain is relieved by lying on the right side, made worse by lying on her back, and unaffected by lying on the left side.

b. In megrim the pain is generally relieved by the horizontal posture. Thus it was in 78 per cent of my cases ; and Liveing alludes to the “almost universal testimony of sufferers that *lying down*, irrespective of posture, is the only thing which affords any relief to the *headache*.”¹ Hence we find that the patient keeps in bed if the seizure comes on the first thing in the morning, and that if already up he goes to bed again, and remains there, keeping the room dark, till the attack passes off. We shall presently see that, as in non-megrinous headache, so in megrim, the horizontal posture gives relief in all probability by securing rest.

Headaches which are easiest in the erect posture.—So much for headaches benefited by the horizontal posture. We have now to consider those in which the pain is easiest in the erect position. Here we must guard against error. A patient with severe headache will sometimes prefer to be up and bustling about rather than lying down, not because the horizontal posture in itself increases pain, but because this is more vividly felt when the body is in repose. Similarly a patient with severe toothache will sit and swing his head to and fro, or walk wildly about, holding it with his hands, the reason in each case being that active movement diverts the nervous energy towards the muscles, and thus the pangs become less acute. As Liveing observes, the pain may become so intolerable that the patient has to move about.² Thus :

¹ *Op. cit.*, p. 322.

² *Op. cit.*, p. 133.

Headache generally relieved by lying down, especially if the head is pressed upon, but when the pain comes on violently is compelled to get up and walk about.

When the pain is bad, he has to get up and walk about.

Walks about all night with the pain.¹

a. Non-megrinous headaches which are easiest in the erect posture.—It has been stated by many that when the headache is aggravated by lying down, it is due to hyperæmia of the head. There is probably more truth in this statement than in the converse one just discussed—that headaches which are relieved by lying down are due to anæmia of the head. In some cases it would appear that, owing to defective action of the vaso-motor system, the cephalic arteries are not properly constricted when the horizontal posture is assumed; too much blood is in consequence sent to the head, and thus headache is aggravated, if present, or, it may be, is started *de novo*:

Headache least severe when standing or sitting; “fearful” if lies down. For a week past has scarcely lain down at all owing to it.

Has had to be propped up.

Has no pain in the upright posture; on lying down, has shooting pains through the occiput.

I have already said that even in chlorotics headache is sometimes made worse by lying down. Marked “thumping” or throbbing is often thus induced, and other unpleasant sensations besides mere pain:

When lying on the left side, there is a “feeling of warm blood on the crown”—not if lying on the right side.

For the past three days there have been noises in the head “like a machine,” directly the head is laid on the pillow.

b. Megrin.—In 22 per cent. of the cases of megrim the pain was decidedly aggravated on lying down. This occurs especially in the variety described by Wilks,² in which the body and limbs are chilly, the radials being contracted, while there is strong pulsation of the carotids and temporals—in that form,

¹ Martineau records a case of syphilitic headache in which the patient was often compelled to rise with the pain. As is well known syphilitic pain is wont to get worse at night.

² “Diseases of the Nervous System,” 2nd edit., p. 549.

namely, in which there is a marked determination of blood to the head¹:

Head throbs during attack ; body and limbs cold ; prefers to sit up and doze (if possible).

Face flushed during attack body chilly ; likes to sit up and rest head back.

Face white during the attack ; feels as if all the blood is going to the head ; the crown hot and throbbing ; prefers to sit up.

The last case is noteworthy. It shows that there may be marked and widespread pulsation of certain cephalic vessels, while the face remains white. In most of the cases of megrim which I have seen, the face during the attack has been pale, and if the patient is questioned as to its usual colour at this time, the reply is generally to the same effect. Thus, in one only of thirteen cases of megrim relieved by lying down was the face said to be flushed during the attack ; in the rest it was described as paler than usual, the terms used to denote the tint being "pale," "yellow," "yellowish," "sallow," "greenish white." This apparently favours the assumption that the cephalic blood-supply in such cases is deficient, and that the horizontal posture affords relief by allowing a larger quantity of blood to go to the head ; but that this is an erroneous view we have seen, since marked throbbing of the head may occur while the face remains pale, and in many of the cases just described not only was great throbbing of the temples but fulness of the head complained of, while at the same time there was shivering of the body and limbs, so that probably some at least of them belong (so far as the vaso-motor state is concerned) to the class described by Wilks.

That the face should remain pale while the carotids and temporals pulsate markedly is not surprising, for the arterioles of the face need not share in the vascular dilatation—nor, indeed, need any of the cephalic arterioles. One may often observe the temporals markedly distended while there is no corresponding flush in the cutaneous area supplied by them. Does not this show

¹ Wepfer writes of a case of hemicrania: "*Præsentē dolore non semper decumbit; si vero decumbat, gravius dolet, dolor est punctorius, simulque oculus dolet*" (*op. cit.*, p. 126).

that there cannot be a corresponding dilatation of the temporal arterioles, and does it not tend to confirm Brunton's observation to the effect that in megrim the proximal end may be dilated while the distal portion is constricted ?

On the whole, I do not think we are at present in a position to explain the influence of posture on the pain of megrim merely by reference to the condition of the vaso-motor system. Perhaps the safest conclusion is this : The horizontal posture, by the rest which it ensures, is beneficial in all cases except those in which there is a marked determination of blood to the head.

CHAPTER XX.

THE BLOOD AND HEADACHE (*continued*). INCREASED ARTERIAL TENSION.

THE relation between headache and arterial tension, as determined by an examination of the pulse, must now occupy our attention.

Here let me at once express my great indebtedness to Broadbent's work on the pulse. It opens up a field of surprising extent and interest, and I have no hesitation in saying that any young physician who neglects to study it does so at the expense of his patients.¹

High arterial tension is frequently associated with headache. Inquiry into the causes of heightened arterial tension discovers that they are many, though there is a mistaken notion abroad that renal disease is almost the only one. Anybody who will examine the pulse of a large number of patients in succession with a view to determining this point, will soon find that tension varies within wide limits among different individuals quite independently of any renal affection, and further, that it varies considerably in the same individual from time to time.

Broadbent sums up the causes of heightened arterial tension thus :

1. Increase in the volume of blood, as in plethora, or after a heavy meal when no compensatory dilatation occurs.

¹ There are, I think, two reasons why the study of the pulse is so neglected by medical men—(1) the little encouragement it receives in the schools, and (2) its inherent difficulty. No one can attain proficiency in examining the pulse who has not devoted much time and attention to the matter. Few things in medicine require nicer discrimination, for instance, than the accurate gauging of blood-tension in the radial artery.

2. Frequent and powerful action of the heart.
3. Arterial contraction, such as that produced by external cold, in the paroxysm of angina pectoris, in rigor, and in megrim.
4. Resistance in the capillaries, due to poisoned blood. (This Broadbent regards as the great cause). Under this head there has to be considered the influence of *a* age, *b* heredity (high tension running in families, and this independently of Bright's disease), *c* renal disease, *d* gout, *e* diabetes of advanced life, *f* lead-poisoning, *g* pregnancy, *h* anæmia, *i* imperfect aëration of the blood (such, for instance, as occurs in emphysema, chronic bronchitis, and phthisis).

Among remote causes are: Excess of nitrogenous diet, whether in the form of red meat, fowl, game, or soups which are rich in extractives; sedentary habits, constipation, alcoholic excess.

The symptoms of heightened arterial pressure are, according to the same authority:—Irritability, giddiness, fulness in the head, pain and oppression in the chest, neuralgia, loss of energy, resolution, and nerve, sometimes breathlessness, and finally the very common one of headache, especially in the form of megrim, which he holds to be always associated with habitual high tension.

It is not contended that all these are invariably to be found along with heightened tension. Many men preserve full energy and nerve until stricken with the fatal paralytic stroke—witness the case of the elder Pitt. Indeed, I have sometimes thought dogged determination a mental characteristic of chronic Bright's disease.¹ That, however, the symptoms enumerated do tend to accompany heightened blood pressure, I have had ample opportunity of proving. Shortly after my attention was directed to the subject by Broadbent's work, I had under observation at the same time three young men of about the

¹ I am aware that Chatham's second administration (1766–8) was a failure, and that even then (10 years before his death, 1778) he showed signs of mental decay, but the chronic renal trouble from which we may be certain he suffered must have been of much longer standing—must, in fact, have left its impress upon the most brilliant period of his career.

same age, and, what was more curious, of the same fair complexion, all of whom had tortuous temporals and tense radials, and were the victims of distressing nervous symptoms, headache among others. Two of them—the third I had no opportunity of treating—were decidedly improved by a plan of treatment which had for its object the reduction of arterial tension.

Haig regards chronic uric-acidæmia as the great cause of heightened arterial pressure, uric acid having the power, so he supposes, of contracting the arterioles: he would, indeed, appear to refer to its action all cases of increased pressure, with the attendant symptoms. Broadbent does not discuss the question whether these symptoms are direct results of increased pressure, or whether they and it both result from a common cause. I incline to the latter view, but, be that as it may, it is certain that cases similar to those just cited are common. I have seen several since, and I have come to regard a careful examination of the pulse as most necessary to the proper diagnosis and treatment of headache.

Mahomed pointed out that there is a pre-albuminuric stage in Bright's disease of which the chief symptoms are: high arterial tension, "cold hands and feet, imperfect digestion, bronchitis, gastric catarrh, headache (especially hemicranial), loss of memory, depression, weariness, cloudiness of intellect, and hypochondriasis"¹—and he attributed this condition to poison in the blood. Haig believes it is due to chronic uric-acidæmia, which, by the arterial constriction which it causes, interferes with the proper action of the skin, liver, and other organs, thus leading to that excess of diffusible albumens in the blood proved by Semmola to exist in Bright's disease—hetero-albuminuria. The renal change he attributes to the irritative action of these albumens. Wherefore, according to him, the three chief links in the morbid chain are (1) uric-acidæmia with its accompanying symptoms of nervousness, high arterial tension, etc., (2) hetero-albuminuria, (3) nephritis.

Numerous writers have commented upon the fact that the subjects of megrim display a tendency to high arterial tension. In the 24 cases of megrim in which I examined the

¹ "Uric Acid," etc., Lond. 1892, p. 203.

radial pulse I found the tension in exactly one half to be normal or subnormal, and in the other half supra-normal. I record these observations with the greatest diffidence, on account of the difficulty of accurately gauging minute variations in tension. I should also state that the sphygmograph was not employed, nor were the results confirmed, except in a few instances, by listening to the click of the aortic valves at the right base and at the left of the apex, as recommended by Broadbent. (I may say in passing that it has often appeared to me that the second aortic sound has been quite loud when radial tension was not high.)

In some of my cases of megrim, however, there could be no doubt as to the degree of tension. In two it was very high. Thus in a man, aged 32, who suffered from typical megrim, the temporals were markedly tortuous and distended, the radials considerably thickened and very incompressible. On the other hand, in three cases my notes run: "radial tension decidedly low"; but I observe among the low-tension cases two marked "very recurrent." Is it possible that such recurrency is sometimes mistaken for high-tension? Very firm pressure is made on the radial, but there is still found to be marked pulsation on the distal side of the part compressed: are not such pulses sometimes thought to be incompressible, whereas, in reality, they are simply recurrent, due, namely, to the blood coming back by collateral routes? It is not generally known how frequent recurrency is; I have found it *far* more often present than absent.

In all the 24 cases the pulse was examined in the afternoon. Perhaps, if the examination had been made during the morning alkaline tide, the number of high-tension cases would have been increased. It should also be observed that most of my patients were women, in whom, according to my experience, arterial tension is lower than in men, and further, they were chiefly from among the poor, whose tension is apt to be lowered by chronic starvation.

Most physicians (*e.g.*, Liveing, Broadbent, Haig) are agreed that arterial tension tends to rise during the actual seizure, and in all those cases—and they are many—in which the patient complains of chilliness of the trunk and limbs, we may,

I think, assume that it does. Is there, however, any certainty that it is *always* increased? I have had opportunities of feeling the radials "tightened" during the seizure, but I have seen at least one case in which there did not appear to be any increase of tension.

The heightened tension observed at this time is by Haig—as usual—attributed to the uric acid which then abounds in the blood, while the diminished flow of urine during the attack results, he assumes, from the renal as well as the other arterioles being constricted by it.¹

The pulse-rate is in inverse proportion to arterial tension, and seeing that high tension is often accompanied by headache, slow pulse and headache not infrequently go together. Notably is this the case during the attack of megrim.

It is therefore interesting to find Vaughan in the early part of this century connecting headache with a slow pulse. He writes: "It seems to me . . . that headach is most frequent from about forty-five years of age, when the pulse becomes gradually slower, to about sixty, after which the pulse begins again to be more frequent."² As, however, it is very doubtful whether headache is especially frequent during the period here mentioned, the following remark is more to the point: Headache is most frequent in the morning and evening, "at both which times the pulse is slow and weak"; it generally ceases or remits at mid-day, "when the pulse is quick and strong." The *slow and weak* pulse here referred to is probably the high-tension pulse of the morning and afternoon alkaline tides ("evening" perhaps referring to the time "after mid-day," and a high-tension pulse, it will be remembered, often feeling weak). The *quick and strong* pulse is apparently the low-tension pulse of the mid-day acid tide, as we may call it.

¹ It must be borne in mind that universal arterial constriction and dilatation both lead to diminished urinary excretion—for the result in either case is diminution in capillary blood-pressure. The most effective way of raising blood-pressure in the renal glomeruli is by a dilatation of the renal arterioles and a constriction of all the others.

It seems strange that uric acid should have an action on the arterioles so contrary to the fitness of things—for by constricting those of the kidney, it must, one would think, tend to check its own elimination.

² "An Essay on Headachs," etc., Lond. 1825, p. 111.

A pulse whose tension is moderately low would be described by some as strong.

The influence of arterial tension on headache has been made the subject of special investigation by E. Lloyd Jones.¹ He first demonstrated that the blood-pressure is raised during the act of sipping cold water (the pulse, as Kronecker had previously pointed out, being at the same time quickened), and that shortly after the cessation of the sipping, the pulse slackens and the blood-pressure falls, each often becoming less than before the sipping. Proceeding then to apply the test thus obtained to some two hundred cases of headache, he found that when the arterial tension was low, the pain gradually diminished during the act of sipping, which raised the blood-pressure, but tended to increase during the stage of reaction, when there was again a fall of pressure; while in cases of headache accompanied by high blood-tension the reverse generally happened.

Increase of cerebral blood-pressure may also be brought about by mastication, by smelling irritating substances, by smoking, by exercise (short of fatigue), by exposure to cold and wind, by general excitement (Brunton); all of which conditions, as Jones points out, may exercise an influence upon headache.

¹ *Practitioner*, vol. xlii., pp. 336-348.

CHAPTER XXI.

DISORDERS OF THE DIGESTIVE ORGANS.

*Historical.*¹—The intimate sympathy between the head and the stomach was well known to the ancients. It was recognised by Galen, Coelius Aurelianus, and Alex. Trallianus, and has been frequently commented upon from their time to our own. The former attributed the headache resulting from gastric disorders (1) to the nervous connection between the head and the stomach, and (2) to morbid vapours passing up from the stomach to the head; and Montalto, writing in the beginning of the seventeenth century, summed up the position thus: “Magnus cum cerebro consensus ex duplici pendet causa; prima est positus et rectitudo, cujus causa ascendentes *vapores* prompte suscepat; altera nervorum est communitas.”²

It will be observed that Galen's views are fundamentally the same as those of to-day. The modern theory is that disordered states of the alimentary tract affect the head in consequence of (1) nerve currents streaming upwards; (2) the accumulation in the blood of poisons resulting from indigestion. These substances the ancients regarded in the light of morbid humours and their vapours, while we call them ptomaines, leucomaines, and nitrogenous excreta. They considered the agency of these poisons to be more effective in causing head troubles than the nervous communication between the brain and stomach; and we are beginning to see that they were right, now that we are

¹ I have elsewhere entered into the history of this subject in some detail (see *Lancet*, vol. ii. p. 933, 1892). I shall therefore only touch very briefly upon it in this work.

² “Archipathologia,” Lut. 1614, p. 137.

no longer dazzled by the brilliant work of Willis, Whytt, Marshall Hall, and Brown-Séquard, who, by showing the importance of peripheral irritation in causing central nerve disturbance, for a time caused these other factors to be overlooked.

Let us now briefly pass in review some of the theories which have been held on the subject of these poisons, so far as they relate to headache. Since the time of Galen yellow bile, one of the cardinal humours, has been regarded as a cause of headache, and it still is by the laity and by not a few physicians. Trallianus, who lived some years later than Galen, and Haly Abbas, who, in common with most Arabian physicians, borrowed largely from Galen, both follow him in looking upon bile as one of the commonest causes of sympathetic headache, and allude, like him, to the relief to the head obtained by vomiting. Very much the same views are to be found in the writings of the Middle Ages and later. The bile or its vapour was supposed to mix with the blood, and forcibly to distend the cerebral vessels—views which no doubt took their origin in the phenomena of megrim, or “bilious headache,” in which disorder the vomiting of bile is a prominent symptom. We now know that the gastric phenomena of megrim are in the main secondary, a fact which has been duly insisted upon by Liveing and others. It is possible, however, that the popular notion regarding the biliary origin of megrim is not altogether erroneous. Lauder Brunton looks upon bile as an accessory factor in its causation, the poisonous element consisting of an alkaloid; and he points out how in these attacks the mere effort of retching, without bringing anything up, sometimes does good, probably by its mechanical effect on the liver. But even granting that errors in the biliary secretion take little or no part in causing megrim, few will deny their power to set up headache of some kind. Deficient secretion implies a sluggish liver, and a sluggish liver is obviously a cause of headache, leading as it does to blood-poisoning; for not only is there imperfect transformation of the poisonous substances brought to it, but the insufficient supply of bile in the intestines resulting from its inactivity gives rise to the undue generation of poisons there. How profound are the nervous disturbances (headache included).

which may result from errors in the hepatic function is well shown in acute yellow atrophy. Murchison, as we all know, attributed lithæmia, of which headache is a prominent symptom, to the liver, and more recently Haig has pointed out the causal relation between uric acid (the formation of which is perhaps closely associated with the hepatic function) and megrim. If, then, we regard the secretion of bile as typifying the hepatic function in general, we must admit a considerable measure of truth in the old views which represented bile as a cause of headache.

Imperfectly digested food has also been a well-recognised cause from of old. Thus, according to Haly Abbas, defective sleep induces headache by occasioning "a corruption of food in the stomach," and he adds "protracted sleep in like manner fills the brain with vapours."¹ It is evident from the following passage that the view that poisons produced in connection with the digestive system are the chief cause of dyspeptic headache prevailed down to the time of Willis: "Headaches," he writes, "which seem to begin in the viscera, and commonly called sympathetic, are wont to be ascribed to vapours" which ascend to the head and induce pain by "piercing and pulling the nerve-fibres." The fact that he makes no mention here of the nervous connection between the stomach and the head shows that in his time little account was taken of it as a factor in the production of this form of headache, a circumstance due, I imagine, to Galen's omitting to state explicitly *how* the nerves establish a sympathy between the two, and contenting himself with the bare statement that an anatomical connection exists. Willis, however, actually attempted to explain the manner in which the head is influenced through the gastric nerves. He assumed the irritating humours in the stomach to so affect the terminal portions of the sympathetic and vagus nerves, that these nerves became *corrugated* and as a result the cerebral membranes to which they were supposed to be distributed *painfully wrinkled*. Thus, his conception of a convulsion or corrugation being continued along a nerve corresponds pretty accurately with the modern notion of a nerve-current.

¹ Paulus Ægineta, *op. cit.*, vol. i., p. 354.

For the next century or more, however, these views gained but little hold on the medical mind, the humoral pathology prevailing. It is somewhat remarkable that the observations of both Galen and Willis on this head should have escaped the notice of so many physicians during the last two or three hundred years, even our own Whytt, as recently as the end of the eighteenth century, failing to do justice to Galen in this respect. The connection between headache and stomach was not, however, entirely lost sight of, several writers during the last two centuries alluding to it, as for instance Montalto, already quoted, and Sennertus, who, however, attaches the chief importance to vapours in causing the head to suffer secondarily to the stomach. These, he contends, are especially apt to come from the stomach, "from which they ascend to the head by means of the œsophagus. Humours and vapours may also come by the veins and arteries and other channels, from the liver, the spleen, the uterus, etc.—for the head, like the roof of a smoky house, receives whatever fumes rise from below, and is necessarily influenced by all parts of the body, owing to the intercommunication of vessels which ramify through it."¹ And we at the latter end of the nineteenth century are beginning to see that a grand fundamental verity underlies this quaint old conception of morbid humours and vapours—to see, in short, that poisons produced within the body play an important part in the phenomena of disease in general, and that dyspeptic headache in particular is chiefly due to such poisoning.

The various views which have been held from time to time as to the relation between gastric disturbance and megrim form an interesting chapter in the history of "dyspeptic headache." They have been adequately discussed by Liveing, to whose work the reader is referred, and need only be briefly mentioned here.² The point at issue has been whether the

¹ Sennerti, "Opera," tom. ii., p. 530, Lugd. 1650.

² "Megrim," etc., Lond. 1873. See p. 233 *et seq.* Tissot, Fothergill, Sir James Clark, and Piorry regarded megrim as secondary to gastric disturbance. C. Lepois, J. Fordyce, Parry, Labarraque, and (according to Murchison, *Lancet*, 1874, vol. iii., p. 538), Sydenham also, held the opposite view. Others who regarded the gastric phenomena as in the main secondary are Andral and Elliotson (*The Lond. Med. Gaz.*, 1832), Dec. 29, p. 403. The latter writes :

gastric disturbance causes the attack, or is part and parcel of it. The latter view is the one now generally held, and is ably defended by Liveing, who, however, acknowledges the occasional influence of an antecedent gastric or intestinal disturbance, or of a particular diet, in precipitating the attack.¹ Wilks appears to hold the same modified view,² which is probably in the main correct. There is little doubt that an antecedent dyspepsia may provoke a seizure: certainly the seizure may be preceded for one or two days by dyspeptic symptoms.

So much for the relation of dyspepsia to megrim. We have now to ask how far simple non-megrinous headache may result from it. At the beginning of this century dyspepsia was regarded as a very potent cause of headache. Thus, one writer in asserting that dyspeptic headache is not common, takes the occasion to observe that it is usually considered so "both by patient and practitioner," and he adds, "The doctrines of Abernethy and Philip have led people to refer almost every complaint of the body to disorders of the digestive organs," while Copland³ complains that headache has been too often referred to disorders of the abdominal viscera, and he is very sceptical as to the existence of Warren's duodenal headache.⁴

That gastric disturbance may provoke pain in the head is shown by the well-known effect of ice on the stomach in producing supra-orbital neuralgia. Todd and Bowman allude to pain over the left brow during gastric derangement, and I have myself recently seen such a case. The patient, a woman, volunteered the statement that she suffered from pain over one of the eyes after taking food. I once noticed in my own person a violent frontal headache after an indigestible mid-day

"I am quite sure that it is very unjust to lay it (megrim) to the charge of the stomach in every case," and he cites his own case in proof of this. At the same time he, in common with Andral, acknowledges that gastric disturbance may bring it on.

¹ *Op. cit.*, pp. 45, 244.

² "Diseases of the Nervous System," Lond. 2nd edit., p. 550.

³ "Diet. of Pract. Med.," Lond. 1844, vol. ii., art. "Headache," p. 142. I little doubt myself that headache may result from intestinal disturbance.

⁴ See also Gilbert Blane, *Trans. of Soc. for Improv. of Med. and Surg. Knowledge*, Lond. 1800, vol. ii., p. 210.

meal. It continued during the remainder of the day, and was only removed by the ejection of the entire contents of the stomach—quite undigested—after repeated vomittings.

But while there can be little doubt that indigestion may cause headache, it is doubtful whether it is as potent a factor in its production as is generally thought. Copland and Burgess,¹ Symonds,² Handfield Jones,³ and Liveing⁴ think its influence has been exaggerated. It has not appeared to Jones that patients with severe gastric disorder suffer especially from headache; he, like Copland, thinks that vertigo is a more common result, and Liveing, after many years practice among hospital out-patients, has come to the same conclusion.⁵ Dyspepsia and headache are undoubtedly extremely common among hospital out-patients—in fact, most of the women suffer from both; but this is no proof that they are causally connected. Before that position can be established we have first to discover how far they synchronise, for, while the patient may suffer from both while attending the hospital, we may find on inquiry that they are by no means cotemporaneous. And even should they exactly synchronise and, what is more, rise and fall together in intensity, it does not follow that the one causes the other, seeing that they may be the co-effects of a common cause. Nay, more than this; even if we find grounds for assuming a causal connection, it is often impossible to say which is cause and which effect. It is, in fact, only in such cases as that just mentioned—and they are not common—in which headache regularly comes on after taking food, that we can conclude with anything like logical certainty that it results from gastric disturbance. In regard to the possibility of the headache and the gastric trouble owning a common cause, we must remember how frequently dyspepsia is of purely nervous origin; it very often, for example, occurs with headache in women in whom menstruation is abnormal, both

¹ *Edin. Med. Journ.*, 1840, p. 95.

² *Med. Times and Gaz.*, May 15, 1858.

³ "Functional Nervous Disorders," Lond. 1870, p. 419.

⁴ *Op. cit.*, pp. 45 and 244.

⁵ *Op. cit.*, p. 241.

conditions then appearing to be the result of a widespread perturbation of the nervous system.¹

If we consider only one symptom of dyspepsia—*i.e.*, pain—we shall often find that it and headache, so far from showing any causal connection, frequently alternate the one with the other. Thus, it is asserted of a case recorded in the “Sepulchretum” of Bonetus:² “*Alternata successione matrona affligitur capitis et ventriculi dolore*”—which exactly corresponds to one of mine, the patient complaining that “when the stomach is bad the head is all right, but when the stomach is well the head is bad.” Similarly, Heberden, after remarking that pain in the head is often associated with stomach troubles, points out that “in very many patients these two parts suffer alternately; whenever the head is well, the stomach is uneasy, and *vice versa*.”³ Here he refers to dyspepsia in general, not to dyspeptic pain only. Clifford Albutt, however, has made the interesting observation that gastralgia and megrim “do not often coincide in time, but rather alternate the one with the other,”⁴ and in my own

¹ My cases bearing upon the relation between dyspepsia and headache may be grouped as follows:—

(a) Bad indigestion, no headache.

Has very bad indigestion, no headache (several).

Is very liable to indigestion, but rarely suffers from headache.

(b) Headache during indigestion.

Heaviness in chest and between shoulders for a month, and during this time headache. Headache comes on with dull pains in epigastrium and middle of back, half an hour after food.

Pain in the top of the forehead comes on with indigestion.

Suffers from flatulence and headache from half an hour to an hour after meals.

Has noticed that head and chest get bad together.

(c) Chronic headache, not worse during indigestion.

Headache for some time. This has not been worse since indigestion has come on.

(d) Chronic headache, worse during indigestion.

Headache, much worse when she has flatulence.

Headache gets worse during indigestion.

Continuous pain over the right eye, gets worse directly after food.

Pain at back of eyes and neck, gets worse after food.

² Lug. 1700, p. 7. ³ “Commentaries,” etc., Lond. 1806, 3rd edit., p. 95.

⁴ *Lancet*, 1884, vol. 1. p. 507.

experience sharp pain in the stomach is rarely associated with marked headache.

The alternation just alluded to appears to be an instance of a law according to which disease in one part tends to be followed by its disappearance in another. This tendency is especially observable in the case of disease attended by pain—witness the pains of rheumatism and neuralgia. I have often been struck with the immunity of the head from pain when the patient has been suffering from severe lumbago, sciatica, or arthritic pains. A great deal has been written about rheumatic headache; how far it is a common complaint will be discussed elsewhere, but I may here point out that when rheumatism affects the trunk or limbs the head is often quite free from pain.

Characteristics of Dyspeptic Headache. a. Part of head affected.—From cases quoted it will be seen that the front part of the head is apt to suffer from gastric irritation, and there is a preponderance of opinion that this is the principal seat of dyspeptic headache. Thus Avicenna writes: The headache which arises from consensus with the stomach generally begins in the anterior part of the synciput."¹ Whytt gives as the most common cause of periodic headache: "Sym-
*pathy with the stomach, by which the nerves chiefly of the fore-
part of the head suffer.*"² Similarly, Stuckens writes: "Nota
quod dolor capitis a ventriculo male affecto, ordinarie solet
respondere parti anteriori capitis."³ Again, Labarraque says
that disturbances of the digestive tract cause frontal and
supra-orbital headache,⁴ a view which Hughlings Jackson also
shares.⁵ Lauder Brunton is more exact than any other
physician in defining the situation of the dyspeptic headache:
"The headache of indigestion, biliousness, and constipation is
generally frontal, but it does not always affect the same part
of the forehead." He finds that frontal headache associated

¹ "Can. Med.," lib. iii. fen. 1, tract. 2, cap. 7.

² "Observations," etc., Edin. 1765, p. 305.

³ "De Dolore Capitis," Brux. 1787.

⁴ "Essai de la Céphalalgie," Paris, 1837, p. 12.

⁵ See "Theory and Practice of Medicine," J. S. Bristowe, Lond. 1890, 989.

with constipation is removed by sulphate of magnesium ; headache just above the eyebrows, without constipation, by acids ; and that situated higher up, also without constipation, by alkalies.¹

Other parts of the head may also suffer in dyspepsia—*e.g.*, the occiput and the vertex. I have known occipital pain to come on regularly after food.

b. Symptoms.—There is nothing in the dyspeptic headache itself by which it can be diagnosed as such. The pain is generally dull, and is often accompanied by a sensation of weight. Sometimes the eyes are peculiarly involved. Among the symptoms Pelham Warren cites are coldness and lightness of the head, depression of spirits, indistinctness of ideas, giddiness, and distension, weight, pain, and stiffness of the eyeballs, and he contends that the headache commonly occurs when the food is passing, or has passed, from the stomach to the duodenum, and that it is often relieved as soon as the upper part of the intestine has been evacuated by a brisk purge—*i.e.*, even before the bowels have been moved in the ordinary sense of the word—a statement which I can confirm.² He also describes a headache which comes on during gastric digestion.³ Lauder Brunton draws attention to the fact that ocular tension may be increased during the headache of so-called biliousness, and he thinks that this condition of the eyes may often produce the frontal headache of dyspepsia.⁴ I have sometimes thought that I have detected it in connection with dyspepsia ; with the stiffness of which Warren speaks

¹ "Disorders of Digestion," 1886, p. 108. The author of the "*Rosa Anglica*" is also very explicit, as is shown by the following passage : "*Sed si dolor sit ab epate tunc est gravado in dextro ipocundrio et in dextra parte capitis. Et si sit a splene : tunc in parte sinistra est gravado, in parte capitis sibi proportionali, et si est ex ventre : tunc est dolor in parte anteriori capitis.*" Fol. 70 a.

² "Of Headaches which arise from a defective action of the digestive organs," Pelham Warren, *Med. Trans. Royal Coll. of Phys. Lond.*, 1813, vol. iv. pp. 233-270.

³ A writer in the *Med.-Chir. Review*, Jan. 1, 1827, p. 34 *n.*, in criticising Warren's view, expresses his belief that headache occurs most frequently when the stomach is empty, being removed by food, wine, or beer ; but this is of course no argument against the existence of dyspeptic headache.

⁴ *Op. cit.*, p. 106.

I am quite familiar; also with soreness and aching of the eyes.

Anstie has some remarks on dyspeptic headache which he thinks it highly necessary to distinguish from megrim. It occurs, he contends, chiefly in those who are suffering from chronic gastric catarrh. "The patient suffers very strikingly, in almost every case, from languor and a feeling of inability to exert himself; and has also much aching pain in the limbs, and usually a pain (sometimes very severe) in the scapular region."¹

Headache is also frequently accompanied by nausea and vomiting, symptoms of which it is by no means easy to determine the exact pathological significance.

It is now generally acknowledged that in classical megrim they constitute part of the storm; but what is their significance in other kinds of headache? Patients suffering from headaches which we find difficulty in regarding as megrinous, frequently complain of accompanying nausea and sickness, and of course, in some of these cases these symptoms may be part of a dyspepsia which is causing the headache; in many others, however, they appear to be secondary, and the question arises whether we are to regard these as examples of megrim. Liveing believes that many headaches which lack the cardinal marks of classical megrim are really megrinous, and I have no doubt that this is the case. Diseases are not fixed, unalterable types: they are infinitely variable. Moreover, and this is a point apt to be lost sight of, an individual may suffer from every degree of a disease—health imperceptibly shading off into disease—and therefore from every degree of megrim; the disorder may, as it were, become arrested at any one point in that inclined plane which leads from the one to the other. But are we then, if we can exclude primary dyspepsia, to regard nausea and vomiting attending headache as always pathognomonic of megrim? I doubt it. I believe, rather, that although a large number of such cases are probably instances of immature or aberrant megrim, some are in no true sense megrinous. It must be remem-

¹ "On Neuralgia and its Counterfeits," p. 277.

bered that pain in general, be it mental or physical, is apt to induce nausea and vomiting, and there is no reason why headache should be an exception to the rule.

Besides headache other abnormal cephalic effects may result from dyspepsia. Of these one of the most common is vertigo. There may also be mental effects, such as muddle-headedness, intellectual apathy, sleepiness, depression of spirits, and other less defined mental states. These are now known to depend in the main upon blood-poisoning.

Nature of Gastric and Intestinal Disturbances tending to Cause Headache.—First, as regards ingesta. Unquestionably some substances are more likely to cause headache than others, and here the element of idiosyncrasy comes into play. Certain articles of diet,¹ like certain smells, appear peculiarly apt to produce headache, some acting directly upon the nervous system, and others indirectly, by disturbing digestion; therefore it is not always easy to say how far they act in the one or the other way. The action of wine, for instance, in producing headache, may be quite independent of indigestion, and similarly as regards the action of excessive nitrogenous diet.

No doubt there are certain forms of dyspepsia more liable to cause headache than others, but it is difficult to specify them further than to say that the condition somewhat vaguely known as biliousness seems especially liable to produce it.² Anstie regards chronic gastritis as a potent cause, and more than one author gives headache as a prominent symptom of acute gastritis, but I am myself inclined to believe that intestinal indigestion is quite as powerful to excite headache as the gastric variety. When I speak of dyspeptic headache I refer to headache resulting from some error in the process of digestion in any portion of the alimentary tract. Errors on the part of the liver, pancreas, and lesser intestinal glands probably have a very important share in the production of

¹ According to Barras, Lorry could not eat "hard-bake" whilst suffering from headache ("Traité des Gastralgies"). Quoted by Cotin, "De la Céphalalgie," Paris, 1847, p. 31.

² Cotin, "De la Céphalalgie," Paris, 1847, p. 24, *et seq.*, names several digestive troubles as provocative of headache.

abnormal cephalic sensations, but as such errors are for the most part purely functional, it is very difficult to state precisely their exact nature, and in most instances of headache arising through them we are unable to give a more specific diagnosis than "dyspeptic" headache.

Constipation is a well-known cause of headache and of a feeling of fulness in the head. Thus, we find Baglivi writing more than a century and a half ago: "*Alvus stricta semper exacerbatur capitis morbos. Pediluvia semper bona. Alvus lubrica bona.*"¹ Weatherhead² lays great stress upon habitual constipation as a cause of headache, and one of my own notes runs: "When the bowels are all right the head is all right." White has frequently observed that "pain in the head, especially towards the occiput" is a common symptom of stricture of the rectum,³ the essential cause here probably being the retention of fecal matter. Brunton remarks upon the fact that constipation, when of short duration, is more apt to cause headache than when long continued; he thinks this favours the view that poisonous substances formed in the intestines and absorbed from it may give rise to headache. "In constipation, it seems not unlikely that poisonous substances are first formed and absorbed, but that they afterwards become either decomposed or excreted by other channels, and thus the effect which they at first produced afterwards diminishes, or entirely disappears."⁴

Intestinal worms are mentioned by Sieveking and Handfield Jones as occasionally causing headache, and this view is supported by E. Henoch, who has known headache disappear after several round worms were passed.⁵ In such cases there can be little doubt that the result is effected by nervous irritation, and not by means of poisons absorbed into the blood.

This is a fit place to mention the fact that hunger frequently sets up headache,⁶ more especially if combined with fatigue.

¹ "*Opera Omnia*," Antwerp, 1715, p. 75.

² "*A Treatise on Headachs*," etc., Lond. 1835, p. 27.

³ Quoted by Vaughan, *op. cit.*, 1825, p. 201.

⁴ *Op. cit.*, pp. 71, 72.

⁵ "*Lectures on Children's Diseases*," New Syd. Soc. transl., 1889, vol. i., p. 351.

⁶ See "*An Essay on Headach*," p. 144.

In such cases a drink or a few mouthfuls of food may be sufficient to remove it. If, however, the fast be prolonged beyond a certain time, food may have no such good effect: it may even increase the severity of the headache. It is difficult to say how temporary starvation causes headache. Apparently one of its results is to diminish the alkalinity of the blood, and therefore the headache in these cases cannot be due to uric-acidæmia. An occasional factor in causation may possibly be exhaustion of the visual organs. But whatever the exact way in which unduly prolonged abstinence from food causes headache, it is necessary to remember that there is a certain class of individuals who should be most careful not to allow too long an interval between meals. This is particularly the case with those presenting the nervous diathesis.

CHAPTER XXII.

DISORDERS OF THE REPRODUCTIVE SYSTEM.¹

DISEASE of the internal genitalia in woman has been held responsible for countless nervous disorders. In so far as it may lead to menstrual irregularity it may undoubtedly cause headache, nothing being more certain in medicine than that profound nervous disturbance may result from such irregularity; but whether uterine disease may independently cause head-pain is not so easy to say. He would be a bold man who would deny the possibility of this occasionally happening, seeing that *irritation in practically any part of the periphery may induce practically any variety of nervous disturbance.*

While not sharing the view of some gynæcologists that such disorders as uterine displacement and superficial abrasion of the cervix are common causes of neuroses, I yet have no doubt that irritation in the internal genitalia may be an occasional factor in their production. At any rate, if any distinct morbid condition exists in these organs it should be treated. The difficulty lies in deciding what is morbid. Matthews Duncan was never tired of impressing upon his pupils the exaggerated importance which had been attached to minor displacements of the uterus, though not denying that such displacements might occasionally call for treatment, as for instance when a retroflexed uterus obstructs the rectum. He moreover contended that reflex troubles resulting from disease in the internal genitalia did not involve any structure above the mammae. I have no doubt that this view is too absolute. The contrary conclusion has been as it were forced upon me

¹ It will be convenient to treat of the influence of menstruation, pregnancy, and lactation in a separate chapter.

in spite of preconceived notions. The following cases conclusively prove that irritation of the uterus and vagina may affect the head. The first is that of a woman, twenty years of age, who one evening while in perfect health and in the middle of the inter-menstrual period thoroughly drenched the vagina with very cold water; this produced unpleasant local sensations, which were felt now and again during the night. The next morning she experienced backache, headache, and "a peculiar dragging sensation in the eyes"—an association of symptoms wont to occur just before a menstrual epoch; they passed off entirely during the day. The second case was that of a patient, thirty-five years old, who complained of a continuous unpleasant sensation in the lower part of the back, and of a sharper ill-defined pain which every now and again travelled up the back to the head, aura-wise. Upon inquiry it was found that she was passing tape-like motions, and examination disclosed a somewhat enlarged uterus which was acutely retroflexed. Mr. Arthur Roberts, who was present at the time, corrected the displacement and inserted a ring pessary, a procedure which had the effect of completely removing the symptoms.¹

I now proceed to give a brief historical account of the subject. From the time of the ancients the causes of headache have been classed as *idiopathic*, or those residing in the head, and *sympathetic*, or those arising in other parts of the body, and among the latter disorders of the stomach and uterus have been regarded as the most potent. It is probable that the "uterus" among the ancients and up to recent times symbolised the

¹ When irritation of the internal generative organs in woman leads to referred pain, it generally causes the *dolor dorsi*, which is well-nigh, if not quite, as common as the *dolor capitis*. Severe backache is also felt in acute diseases of the testis—a fact of great interest. Hilton pointed out that disease of a viscus is apt to cause pain in the overlying body wall. Now the ovaries, testes, and kidneys are developed from contiguous tissue in the embryo, and they belong rather to the posterior than to the anterior wall of the body cavity. Hence when these organs are irritated, backache is apt to occur. That the testes have come to be extra-abdominal organs in no wise interferes with their central nervous arrangements. We can on similar lines explain the fact that the pain in renal colic shoots down the ureter to the testis of the affected side: the kidney, ureter, and testis of one side are developed from contiguous tissue in the embryo, and have therefore a corresponding contiguity of sensorial nerve-tissue.

entire internal genitalia in the woman; at all events little mention is made of the ovaries as a cause of reflex trouble before the present century.

Galen enters at length into headache arising from diseases of the uterus, and especially alludes to the pain and sensation of weight in the head which may occur as a result of abortion and uterine tumours.¹ Thonerus records several cases of headache thought to have a uterine origin. In one of these the pain was felt at the sinciput and was supposed to be caused "by malignant vapours ascending from the nterus and rending the cerebral membranes."² About the same time Sennertus writes: "The nterus may cause pain in different parts of the body, headache being the most common and severe. It is occasioned either by a humonr or a vapour which passes from the uterus to the head by the arteries and veins, being then effused into the cerebral membranes and so stretching and tearing them as to cause pain."³ This notion of morbid vapours passing up from the uterus and affecting the head is to be found among numbers of other writers.

Coming to more recent times, we find Tyler describing a headache thought to be almost pathognomonic of uterine disease, the chief feature being vertical pressure.⁴ Grailly Hewitt asserts that "very intense cephalalgia is occasionally observed in connection with long-standing flexion of the uterus,"⁵ and that the pain may be so intense as to compel the sufferer to remain in bed for days together, unable to bear the light, or even to be spoken to. He cites the case of a woman with anteflexion, who for two years snffered from a headache which was entirely cured by the application of a uterine stem; the symptoms returned after the removal of the pessary, and it was found necessary to resort to it again. He has also seen cases of severe headache accompanying uterine fibroid, the pain being worst if the fibroids are small. Barnes is another who

¹ Kühn's edit., vol. xviiA, p. 799.

² See his "Observationes Medicinales," etc., Ulmæ, 1651, pp. 80-81, 83.

³ Sennerti, "Opera," Lug. 1650, tom. iii. p. 99.

⁴ *New Hampshire Journ. of Med.*, Nov. 1851, p. 62; *Journ. of Gynecology Soc. of Boston*, May, 1870, p. 262.

⁵ "Diseases of Women," Lond. 1882, p. 569.

mentions headache as a prominent symptom of uterine disease.¹

The old writers exercised themselves considerably as to the situation of the pain in what they termed uterine headache. According to Galen its usual seat is the *sinciput*, and Avicenna follows him in this, adding that the pain occurs most frequently after labour and abortion, or after suppressed or scanty menses.² On the other hand, in the "*Rosa Anglica*" the occiput is given as the chief seat.³ A remark frequently quoted is that of Langius,⁴ to the effect that women with uterine disease suffer from pain in the crown near the coronal suture, where also may be felt an icy coldness and a sensation as of a weight pressing.⁵ Laurent Jubertus placed uterine headache in the vertex and occiput;⁶ L. Mercatus, in the latter situation;⁷ Sennertus maintained that it might affect the whole head, one half of it, or the lower frontal region;⁸ while in the "*Sepulchretum*" of Bonetus it is stated that the whole of the head is affected, but the *sinciput* chiefly.⁹

I have now cited a sufficient number of authorities to show that "uterine headache" has received considerable attention from the physicians of the past. It is probable that what most of them had in view when describing this headache is that variety which so frequently accompanies menstrual irregularity, in connection with which it is certain that pain and other morbid sensations in the vertex are of common occurrence,

¹ "Diseases of Women," Lond. 1873. See index to this work, "Headache."

² "Canon Med.," lib. iii. fen. i, tract. 2, cap. 7.

³ 1502, p. 70.

⁴ Lib. i. epist. 49, quoted by Stuckens.

⁵ Among the writers quoting this observation are Sennertus, Bonetus, Klein, and Stuckens. Pain in the vertex is certainly very common in women, as also are other abnormal sensations, such as pressure, burning, coldness, irritation. There is, however, no evidence that morbid sensations in the vertex have any special connection with the uterus. They occur in conditions of nervous debility from whatever cause arising, and it is not therefore surprising that they are frequently met with in disorders of the reproductive system.

⁶ Quoted by Sennertus, *op. cit.*, tom. ii., Lug. 1650, pp. 530-1.

⁷ *Ibid.*, *op. cit.*, tom. iii., p. 100.

⁸ *Ibid.*, tom. iii., p. 99.

⁹ "De Dolore Capitis," Lug. 1700, tom. i.

more especially if the woman is run down. Otherwise it may, I think, safely be said that uterine headache has no special seat of election, and no peculiar manifestation by which it may be diagnosed from any other headache.¹

Next as regards the male sex. I have not met with any cases showing that organic disease of the male genitalia has any peculiar relation to headache. Sequin, however, mentions genital irritation as a cause. Thus he writes: "One of the worst cases of occipital headache we ever saw in a child was cured by circumcision."²

Doubtless functional disturbances of the male reproductive system may be connected with headache. A number of writers give sexual excess as a cause. Such are Hippocrates,³ Galen,⁴ Avicenna,⁵ Willis,⁶ Montalto,⁷ Forestus,⁸ Erb,⁹ Pariset,¹⁰ Cotin,¹¹ and Henoeh,¹² who mentions masturbation as a cause in children. It is not surprising that sexual excess should cause headache, for anything that seriously interferes with nervous health may do this. I have elsewhere alluded to the fact that such excess has a very decided influence on the eyes, and it is probably partly in this way that it causes headache.

¹ Edis ("Diseases of Women," 1882, p. 141) and Dana (*Medical News*, March 16, 1889) state that the headache from endometritis is vertical, and the latter writer has a diagram in which he exactly maps out its situation. Routh is scarcely less precise. He speaks of frontal headache being caused by cervical stenosis, and prolapse of the uterus causing occipital or vertical headache. "Flexions or versions, *apart from descent*, do not produce these headaches, not *per se* causing pelvic congestion."

² Keating's "Cyclopædia of Diseases of Children," Edin. and Lond., vol. iv., p. 838.

³ "Works," trans. by Francis Adams, Lond. 1849, vol. i., p. 331.

⁴ *Op. cit.*, vol. xv., p. 900.

⁵ This writer has a chapter of which the heading is "De cura sodæ evenientis ex coitu" (*op. cit.*, lib. iii. fen. 1, tract. 2, cap. 25).

⁶ *Op. cit.*, p. 84.

⁷ "Arehipathologia," Lut. 1614, p. 59.

⁸ "Observant. et Curant. Med.," Francof. 1602, lib. ix. obs. 29. This reference is on the authority of Ploucquet, *op. cit.*, and will be found under "Coitus," tom. i., p. 215.

⁹ Ziemssen's "Eneye.," vol. xi., p. 141.

¹⁰ "Dict. des Sciences Méd.," Paris, 1813, Art. "Céphalalgie."

¹¹ "De la Céphalalgie," Paris, 1847, p. 13.

¹² "Lect. on Children's Diseases," New Sydenham Soc. transl., vol. i. p. 351.

Some have contended that enforced chastity may cause headache. A recent writer in the *Practitioner* regards it as a cause of megrim, on the ground that it is more common in the unmarried than in the married. The older writers supposed the retained semen to become corrupted and to generate morbid vapours which, ascending to the head, affect it injuriously.¹

Spermatophobists are often the victims of general nervousness, of which headache may form part. This nervousness probably does not result from any disorder in the reproductive organs, although probably related to the sexual individual, for sex permeates, as it were, the entire body. Thus spermatophobia and allied disorders are essentially sexual complaints, though not disorders of the sexual organs. Putting aside the specific mental element in spermatophobia, we find a remarkable likeness between the general symptoms attending it and those which accompany menstrual irregularities in the woman: the symptoms in each case are essentially bound up with the sexual system.

¹ Thus Montalto ("Archipathologia," 1649, p. 59), who gives, as causes of headache, "Veneris immoderatus usus, nimium item ejusdem abstinencia. . . . Semen enim ex retentione inpravam abit correptem, a quo elevati vapores caput impetunt."

CHAPTER XXIII.

DISORDERS OF THE REPRODUCTIVE SYSTEM—(*continued*).—THE INFLUENCE OF THE NORMAL MENSTRUAL RHYTHM, PUBERTY, THE CLIMACTERIC, ABNORMAL MENSTRUATION, PREGNANCY, AND LACTATION ON HEADACHE.

WE must not think of menstruation as involving the period of uterine flux only, but as a rhythm of one month's duration. I have elsewhere suggested¹ that this rhythm continues repeating itself throughout the entire life of the human female. While we do not certainly know that it begins with the beginning of life, we do know that it frequently antedates by some months the first appearance of the flux,² and that it may last after the climacteric for some time at least; it is also certain that the rhythm continues during pregnancy and lactation. These several rhythms which are, on an average, of twenty-eight days' duration, are marked by periods of a few days' duration, which in ordinary menstruation are attended by hæmorrhage from the uterus. We may therefore speak of *a*, ante-pubertal epochs; *b*, ordinary menstrual epochs; *c*, pregnancy epochs; *d*, lactation epochs; *e*, post-climacteric epochs.

The relation of headache to these various epochs has now to be considered.

a. Ante-Pubertal Epochs.—It is not very uncommon for a girl to suffer from monthly recurring headache before puberty.

¹ "Differences in the Nervous Organisation of Man and Woman," Lond. 1891, p. 241.

² In a case of delayed puberty under my observation, ante-pubertal epochs occurred every month for some years.

Sometimes these headaches are of the megrinous type. Here is an example :

æt. 14. Not yet menst. For the last five months has suffered from bilious headaches about once every month. The headache begins the first thing in the morning, and lasts all day. She has nausea and vomits. The face is pale during the pain, and she feels cold in the body. Obtains most relief in the recumbent posture. Radial tension not unduly high.

b. Ordinary Menstrual Epochs.—The influence of menstruation on headache has been recognised by a large number of writers.¹ As the epoch approaches, the irritability of the nervous system rises ; with, or shortly after, the advent of the flux it usually declines, and it rapidly falls during its last days and immediately after its cessation. I find from my notes that most cases of headache influenced by menstruation occur just before the flux.² The headache may cease with the setting in of the flow, or it may continue during a part, or the whole of the period. In a smaller number of cases it begins during the flux, while those in which it commences after it are comparatively rare.³ The influence of menstruation in this respect is, however, not always the same in the same individual. Thus, one patient asserted that her megrim began “just before, just at the beginning, or just at the end of the flow ;” and another “just before, or directly after.”

A few words as to the means by which menstruation influences headache. Mackenzie contends that it is by inducing congestion in the nasal mucous-membrane.⁴ He insists upon the analogy between the erectile tissue of the nose and that of

¹ Liveing mentions among them Willis, Tissot, Calmeil, Fordyce, Fothergill, Labarraque, Van der Linden, Symonds. See Liveing, *op. cit.*, pp. 46, 57, 248. To these may be added Stahl (“Med. dog. syst.,” Halæ, 1707, sect. ii. p. 666) and Stuckens (“De Dolore Capitis,” Brux. 1787).

² Henoeh, in pointing out that megrim is related to the menstrual epoch, observes that the attack occurs either before or during the flux ; less frequently, after it (*Deutsche Klinik*, April 2, 1859).

³ It is interesting to note that the epileptic fit, when influenced by menstruation, occurs, like headache, most frequently before, less frequently during, and only very seldom after the flux. (See “Epilepsy,” etc., W. R. Gowers, Lond. 1881, p. 198.)

⁴ *Annales des Maladies de l'Oreille*, vol. x., p. 101.

the penis (and vulva), and urges that numerous facts tend to show that the condition of the reproductive organs influences the olfactory system. Hence, he says, nasal engorgement occurs in many women regularly every month, epistaxis sometimes replacing the menstrual flux; and he has noticed that when nasal disorders occur in women, they are aggravated during menstruation. In like manner, Joal, in a paper on epistaxis, has attempted to bring into sympathetic association menstrual congestion and the erection of the nasal mucous membrane; he also suggests that masturbation may cause headache by affecting the nose.¹ Haig finds a ready explanation. He points out that at the time of menstruation digestion is apt to be impaired, and exercise to be neglected. As a result nutrition fails, there is a fall in urea-production and in the acidity of the urine (for the two generally rise and fall together), and acidity being lowered, uric-acidæmia is induced, with its attendant symptoms.² Head assumes that menstruation predisposes to painful affections by lowering the "specific resistance" of nerve-centres to "sensory impulses" (the term "specific" here implying that different centres differ in regard to the resistance they oppose to such impulses). If, therefore, we suppose some local irritation, such as hypermetropia, to exist, menstruation, by diminishing this resistance, will predispose to pain; and should the hypermetropia cause more or less constant pain, menstruation will induce "agonising headache, which may spread on to the neck."³

c. Pregnancy Epochs.—These epochs, which are rarely recognised as such by the woman, are apt to be attended by many nervous symptoms, headache among the number. When such symptoms attend the ordinary menstrual epoch in a marked degree, pregnancy is observed to have a beneficial effect, the epochs and the nervous erethism accompanying them becoming less pronounced. Thus pregnancy sometimes has the effect of temporarily removing megrim, as happened with a patient of Liveing's,⁴ and he refers to the similar experience of Heberden :

¹ *Ann. des Mals. de l'Oreille*, tom. xiv. p. 267.

² A. Haig, "Uric Acid," etc., Lond. 1892, p. 79.

³ *Brain* (Parts i. and ii., 1893, pp. 104-107).

⁴ *Op. cit.*, pp. 46-47.

“*Fœminis gravidis pepercit quas semper alias vexabat hemi-crania.*”¹ It is highly probable that in these cases the megrim was of the menstrual type.

d. Lactation Epochs.—Opportunity for studying these epochs seldom presents itself. In one case I observed headache attending them, along with other symptoms of nervousness.

c. Post-Climacteric Epochs.—Labarraque (*op. cit.*, p. 20) quotes Wepfer to the effect that the menstrual epochs are often replaced at the climacteric by monthly recurring megrim, but very few of Wepfer’s recorded cases of hemicrania would now be called megrim, and what he observed were no doubt post-climacteric epochs, on which non-megrinous headache is a very common attendant.² I was very sceptical as to whether genuine megrim ever comes on at the climacteric in the way described until the following case came before me :

F., æt. 43. Not menstruated for ten months. At the times when she ought to be unwell she suffers from severe headache and sickness. The pain is chiefly in the occipital region, and is greatly aggravated by lying down. The attack generally lasts one day, but may last two. Had similar attacks of “sick headache” when about twenty for a year or so, but none since until the present time.

Pariset³ also refers to the headache which may occur every month after the climacteric suppression of the flux.

So much for the normal menstrual epochs and their influence on headache. The connection between abnormal menstruation and headache will be dealt with directly, but in the meantime a word as to the influence of those two critical periods in the woman’s life—puberty and the climacteric—the one marking the beginning and the other the end of menstruation, as ordinarily understood.

Puberty.—Headache is very common in the girl at puberty. It and abdominal pains, stitch in the side, backache, and general languor constitute the characteristic symptoms of this period. There is nothing distinctive in the headache. It may be frontal, occipital, or vertical, and is often attended by giddiness ; also by nausea sometimes.

¹ *Op. cit.*, p. 179.

² See “Differences in the Nervous Organisation of Man and Woman,” Lond. 1891, p. 266, by the Author.

³ “Dict. des Sciences Méd.,” Paris, 1813, p. 419.

The Climacteric.—At no period of her life does the woman suffer so frequently or so generally from headache as during the climacteric, and a large proportion of my cases are of climacteric origin. Pain, weight, and other morbid sensations on the crown, together with great tenderness of it and of the scalp generally, constitute the chief characteristics of the climacteric headache, though the same group of symptoms may occur at other periods of life. This headache, like other symptoms of the climacteric, generally begins to make its appearance some time before the first irregularity in the menstrual flux, and, as a rule, lasts some time—it may be years—after its final cessation. Although the woman in post-climacteric life is apt to lose that nervous erethism which prevails during the reproductive period, yet, as I have elsewhere observed,¹ she then often experiences traits of nervousness of which headache is wont to be a prominent feature.

Menstrual irregularities constitute a fruitful source of nervousness, and doubtless help to cause it both at puberty and the climacteric. They have been regarded from time immemorial as a potent cause of ill-health, but though they are certainly inconsistent with perfect well-being, it is not always easy to say how far the ill-health which attends menstrual irregularity results from it, and how far both result from a common cause. In chlorosis, the amenorrhœa and general ill-health accompanying it are manifestly co-results; but, on the other hand, that ill-health may be the direct outcome of modifications in the flux is shown by the effect—notably upon the nervous system—of sudden suppression. The headache, giddiness, flushes, &c., which are then set up are well known. I have notes of many such cases. Sauvages termed headache thus arising *Cephalalgia catamenialis*, and that resulting from suppression of the hæmorrhoidal flux, *Ceph. hæmorrhoidalis*. Among the numerous writers who have alluded to the former are — Galen,² Willis,³ Stuckens,⁴

¹ See chapter on Age and Headache.

² See Kühn's edit., vol. viii., p. 435.

³ Willis observes that headache frequently ensues "upon the suppression of the monthly flowers, or the lochia, after being brought to bed," *op. cit.*, p. 124.

⁴ "De Dolore Capitis," Brux. 1787. Stuckens alludes to headache from menstrual and lochial suppression.

Graves,¹ Labarraque,² Cotin,³ Pariset.⁴ The fact that deficiency in the menstrual flux may be a direct cause of headache is shown by such cases as the following :—

Headache relieved by blood loss.

Headache better after she has been unwell.

Headache worse since the menorrhagia ceased.

Menorrhagia also, like amenorrhœa, may be associated with headache. This may either result from that erratic state of the nervous system of which the menorrhagia is the outcome,⁵ or from the anæmia which is apt to supervene on the menorrhagia.

Other menstrual abnormalities, such as dysmenorrhœa and irregularities in point of time are (except when due to organic disease) generally the result of disordered nervous action, of which also the headache and other nervous symptoms accompanying them are the direct outcome.

Pregnancy.—We have seen that headache may occur at the pregnancy epochs, but that, as these are less pronounced than the ordinary menstrual epochs, pregnancy sometimes relieves or temporarily cures a headache which has been wont to occur with every menstruation. During the whole term of pregnancy, however, quite apart from the pregnancy-epochs, the nervous system is peculiarly prone to a host of nervous disturbances. More particularly is this the case—in my experience—with the later pregnancies. Among the various symptoms then arising headache is prominent. Some writers have described it as of a specific kind. Thus Sauvages⁶ speaks of *Cephalalgia gravidarum* occurring about the third month of gestation, and due, he supposes, to plethora resulting from suppressed menstruation; and Pariset⁷ classified it with the headache resulting from suppression of the hæmorrhoidal or uterine flux.⁸ On

¹ "On the Headache of Young Women," *Dublin Journal of Med. and Chem. Science*, May 1, 1833.

² "Essai sur la Céphalalgie," Paris, 1837, p. 15.

³ "De la Céphalalgie," Paris, 1847, p. 10.

⁴ "Diet. des Sci. Méd.," Paris, 1813, p. 419. Ploucquet *op. cit.*, vol. i., p. 217. gives several references.

⁵ I am here referring to menorrhagia occurring independently of organic uterine disease.

⁶ Quoted by Cotin, *op. cit.*, p. 11.

⁷ Also quoted by Cotin, *loc. cit.*

⁸ According to Beccaria pregnant women are liable to a sharp "pulsating

examining my notes of headaches occurring during pregnancy, I am unable to find any evidence of a distinctive variety. The headaches occurred at all periods of the term, though most frequently from the third to the sixth month, and the seat and nature of the pain varied considerably. In some it was very localised, in others it was more widespread, involving the forehead, vertex, or occiput, or all three together; and as regards character, in some it was "neuralgic," in others "dull," in others again "thumping," and so forth.

My notes also show emphatically that the tendency, during pregnancy, to headache and other nervous symptoms, increases as the climacteric is approached.

Lactation, like pregnancy, has an influence on nervous health quite apart from the epochs occurring during it. It generally operates by inducing anæmia and exhaustion, and therefore its characteristic headache is essentially the anæmic variety. Such cases are of every-day occurrence in the out-patient department of the large London hospitals. Liveing¹ points out that prolonged lactation, as indeed anything that tends to lower the standard of health, always increases the tendency to megrim; and many of the older writers refer to its influence on headache.²

pain in the occipital region, where Gall places the instinct of reproduction; and Alex. Hamilton gives headache among the signs of pregnancy. See Montgomery, "Signs and Symptoms of Pregnancy," Lond. 1856, p. 284.

¹ *Op. cit.*, p. 27.

² See, for instance, "Ephemerides Physico-Medicæ Nat. Cur.," Centuriæ i. and ii., observ. 46. This is given on the authority of Ploucquet, who also gives "Metastasis lactea" as a cause (*op. cit.*, vol. i., p. 217), one Richter having recorded a case of headache that was "cured by the discharge of a milky substance from the nose."

CHAPTER XXIV.

SYPHILIS.

HEADACHE is one of the most obtrusive symptoms of syphilis, and it is not therefore surprising to find frequent mention of *Cephalaea a venerea lue*, and *a lue Gallica*, made by the older writers, such as Montalto,¹ Thonerus,² Riverius,³ Rosenkius,⁴ Stahl,⁵ and Heberden;⁶ and doubtless many physicians of yet older date were familiar with it.

It will be convenient to consider this headache under two varieties: (1) The functional—that which is not directly traceable to a gross lesion; (2) the organic—that which is manifestly due to some gross organic lesion, such as cranial caries, or gumma of the brain.

(1) *The Functional Variety*.—As in other contagious disorders so in syphilis, constitutional symptoms manifest themselves a certain time after infection. Among these headache is prominent, and it may be so severe as to interfere with thought, work, and even sleep.⁷

¹ "Archipathologia," 1614, p. 71.

² "Observationes Medicinales," Ulmæ, 1651, obs. iv. p. 82.

³ "Observationes," etc., Hagæ Comitum, 1656, Centuria ii. obs. 91.

⁴ "Tract. de Dol. Capitis," p. 106. This writer describes the case of a man, thirty years of age, with a suspicious history of lues, who suffered from a continuous headache, and in whom cranial caries was found after death. In a note on the same case in the "Sepulchretum" (Lug. 1700, vol. i., p. 56) we read: "In lue venerea sæpe ingentes et continui excitantur dolores," the pains being attributed to disease of the skull and its membranes, the writer adding: "not even those who are cured by mercury escape."

⁵ "Med. Dog. Syst.," Halæ, 1707, sect. ii. p. 669.

⁶ "Commentaries," Lond. 1806, 3rd edit., p. 94.

⁷ See Theodor Rumpf, "Die Syph. Erkrankungen des Nervensystems," Wiesbaden, 1887, pp. 15, 16.

Fournier¹ lays great stress upon the headache which accompanies secondary syphilis. The following is an epitome of his remarks on the subject:

The nervous symptoms occurring during the secondary stage are infinitely more common and pronounced in women than in men, a veritable nervous diathesis being engendered during it. Of these symptoms the most common is headache.² It is not due to cranial lesion, nor to involvement of the cranial nerves; the pain is diffuse, deep-seated, and extremely severe. It is probably intra-cranial, headache, *par excellence*—an “encephalalgia.” Although wide-spread, it may be chiefly felt in some one region, as the forehead, temples, or occiput. Associated with it there may be a sensation of pressure, heaviness, beating, etc. Four grades of this headache may be distinguished. In the first, the patient can sleep and carry on his work. In the second, the pain is more intense, hindering work and disturbing sleep. In the third, the patient is incapable of any kind of effort; he is absorbed, prostrated, stupefied by the violence of the pain. In the fourth, he is literally mad with agony; he lowers the head between the knees, writhes, twists on the bed, gets up and lies down again every moment, rolls upon the ground, shrieks, and comports himself like one possessed.

Appetite and digestion are interfered with, and there is apt to be constipation. Above all the mind is affected, the patient being dull and melancholy. Vertigo and visual disturbances may be present, the patients during the height of the pain complaining of a mist or veil before the eyes.

The pain is either continuous, increasing from time to time, or intermittent. In the former case the exacerbations occur chiefly at night; in the latter the pain is generally present at night only. It may last from a few days to a year. “I have seen women suffer the most horrible pain for months together,” quite ignorant of the real cause.

Now the above symptoms are very common in women below par; except for the violence the pain may attain to, they correspond, in fact, to the symptoms of nervous debility, and it would therefore be very interesting to ascertain whether they occur in syphilitic women who are well nourished. But that they are not simply symptoms of nervous debility but stand in causal connection with the syphilitic virus, is shown: (a) By the extraordinary increase of the pain at night-time—(for though such an increase may occur in non-syphilitic pains, it does not take place in the same degree as in the cases here

¹ “Leçons Cliniques sur la Syphilis,” Paris, 1881, p. 575 *et seq.*

² Fournier terms it *Céphalée*, a word still retained by French writers.

described),¹ and (b) by the almost instantaneous effect of mercury upon them.

McLean, in common with Fournier, insists that syphilis may produce headache independently of gross organic lesion. "One of the commonest and least known effects of syphilis," he writes, "is simple headache, unaccompanied by nodes or by any form of secondary or tertiary eruption." Such headaches he has known to last for weeks, months, or even years.

(2) *The Organic Variety*.—Headache is a common result of gross syphilitic lesion, "not only attending but very commonly preceding an outbreak of syphilis in the nervous system." Thus, according to Drummond, it is seldom "that syphilis of the nervous system is present without being preceded by headache, and it is by far the most valuable premonitory symptom of an outburst of nerve-syphilis which we possess. It is not uncommon for us to meet with cases of the following kind: the patient suffers from an intense headache, which lasts more or less continuously for five or six weeks, and has the usual characteristics of well-marked nocturnal exacerbations and sleeplessness. Three months afterwards syphilitic paraplegia comes on, or hemiplegia with aphasia. These grave accidents might have been altogether prevented had the significance of the headache been recognised."²

Heubner³ lays great stress upon the headache of cerebral syphilis. It is, he says, the most striking symptom, being scarcely ever absent, and preceding the more distinct appearance of the disease for days or years. He thinks that this premonitory headache is due to extra-cranial causes, in proof of which he points out that in almost every case of cranial syphilis signs of its presence are found *post mortem* in the skull in the form of shallow cicatrices, osteophytes, or gummatus inflammations; that gummata in the head may often be detected during life just before an outbreak; that the patients often point to cicatrices as the seat of greatest pain;

¹ "Rumpf (*op. cit.*, p. 273) contends that the nightly exacerbation of this headache cannot be taken as evidence of its specific nature.

² "Syph. Affections of the Nervous System," Glasgow, 1889, T. McCall Anderson, p. 73 (Report of Meeting of the Brit. Med. Assoc. at Glasgow, 1888).

³ Ziemssen's "Encyc.," vol. xii., p. 317.

and that the extra-cranial structures are, as compared with the intra-cranial, exceedingly sensitive.

Rumpf¹ refers to the headache which generally precedes an attack of convulsions from syphilitic lesion, and Gowers emphasises the fact that headache nearly always heralds the onset of hemiplegia from syphilitic thrombosis.

The syphilitic lesions causing headache may be thus classified: affections of: *a*, the skull and extra-cranial structures; *b*, the meninges; *c*, the brain.

a. Probably the majority of organic syphilitic headaches take their origin in lesions of the skull and extra-cranial structures. We have seen that Heubner attributes the premonitory headache to them. A number of writers, and among them Heubner, Buzzard, Charcot,² Brunton,³ Rumpf,⁴ allude to the frequency with which the pain in syphilitic headache is circumscribed to one spot, and its localisation, it need scarcely be said, favours the view that it is due to disease of the aforesaid structures. Another frequent characteristic of this headache is tenderness, which may also be localised.⁵

b. Syphilitic disease of the meninges may take the form of diffuse meningitis, or of a more localised gummatous process. The former occurs chiefly at the base of the brain, and is apt to involve the cranial nerves, thereby producing paralysis and neuralgia. The latter is more apt to involve the convexity of the brain, and thus often implicates the motor convolutions, producing "Jacksonian epilepsy." It is not

¹ *Op. cit.*, p. 164.

² The two latter authorities are quoted by Heubner, who points out that the whole head is seldom affected, the pain being generally lateral, affecting either the anterior or the posterior lateral half on one spot, and thence radiating or remaining fixed as in *clavus* (*op. cit.*, p. 318).

³ "Disorders of Digestion," Lond. 1886, p. 111.

⁴ "Often the pains in the head, after the manner of neuralgia, fix upon a certain spot in the cranium, and neither waver nor slacken" (Rumpf, *op. cit.*, p. 164).

⁵ According to Ross, the tenderness may be so great that the patient cannot lay the head down on the pillow ("Diseases of the Nerv. System," 1883, vol. i., p. 692), and Heubner writes: "It is a highly important fact, not always sufficiently noticed, that this headache, when it can be localised, is generally made distinctly worse by pressure at certain points," which he assumes would not be the case if it were due to intra-cranial causes (*op. cit.*, p. 318). According to Ferrier, however, intra-cranial disease also may cause tenderness.

surprising that in motor disturbances "the parietal bone is often the seat of the headache."¹ When there is implication of the meninges, the headache attains all the violence of that produced by cerebral tumour.

c. Syphilitic disease of the brain may take the form of gumma, which, however, is much less frequently met with in the depths of the brain than near the surface; or it may occur as endo-arteritis, which may lead to thrombosis. The symptoms of gumma in the brain are practically the same as those of any other tumour. Syphilitic thrombosis, according to Gowers, does not involve the large arteries, but some one or other of their smaller branches, the orifice of which has become much narrowed. Among fifty such cases occurring in his practice, by far the most common effect was hemiplegia without loss of consciousness. "Of great significance also is the fact that the onset in more than half the cases was preceded by headache. The pain was usually great, and was either general or chiefly on the side of the subsequent lesion. It preceded the onset sometimes for only a few days, or a week, often for several weeks, rarely for two or three months. It is apparently in some way due to arterial disease itself."²

Characters of Syphilitic Headache in General.—Beyond the facts that the pain is apt to be circumscribed, that local tenderness from disease of the skull or overlying parts is often present, and that there is a marked tendency to an increase of the pain at night, there is nothing in the syphilitic headache *per se* which can be considered definitely characteristic. The symptoms described by Fournier as characterising the headache of secondary syphilis are, as we saw, practically the same as those met with in neurasthenic women. The nightly increase of the pain might suggest syphilis, but without other more definite evidence—*e.g.*, the evidence obtained by the effects of ante-syphilitic treatment—it would not be possible to diagnose it.

It appears that a sensation of pressure on the vertex has been thought to be its special characteristic. Rumpf rightly

¹ Rumpf, *op. cit.*, p. 164.

² *Lancet*, 1889, vol. i., p. 298.

contests this view,¹ though he believes it is present in a fair number of cases, and he cites a case where this symptom increased towards the evening, reached its height at 2 A.M., and compelled the patient to wander from room to room till the morning.

Heubner observes,² and this is a point of some importance, that in syphilis there may be long intervals of freedom from pain even without treatment.

¹ *Op. cit.*, p. 252.

² *Op. cit.*, p. 317.

CHAPTER XXV.

GOUT.

MANY of the older writers refer to the cerebral symptoms which may accompany gout, but those they describe are, according to Sir Dyce Duckworth, uræmic rather than gouty.¹

The connection between megrim and gout, however, is now a well-established fact, though, as Duckworth points out, this form of headache occurs generally as a manifestation of suppressed rather than of frank gout. Similarly Haig writes: "So far as my experience goes, patients generally have headache early in life and gout later, but not the two together."²

My own experience certainly is that those who have frank gout are not particularly liable to megrim, judging, at least, from hospital patients. Furthermore, I have been struck by the fact that many men suffering from articular gout have never displayed peculiar liability to headache of any kind.

Liveing³ quotes from a number of writers—*e.g.*, Fordyce, Tissot, Labarraque, Parry, Möllendorff, Sir Henry Holland, Trousseau and Scudamore—passages affirming not only a connection between the two, but the occasional displacement of the one by the other, and on his own account he adds: "There can be no question then, I think, as to the frequent connection of megrim, whether in its blind, sick, or simply hemicranial forms, with a gouty diathesis, and its occasional displacement by fits of regular gout."

¹ "A Treatise on Gout," Lond. 1889, p. 224.

² "Uric Acid," etc., Lond. 1892, p. 81.

³ "On Megrim," etc., Lond. 1873, pp. 399-404.

Other writers who have insisted upon the same connection are Whytt, Vaughan,¹ Heberden,² Weatherhead,³ Cotin,⁴ Murchison,⁵ Ross,⁶ Symonds,⁷ Wilks,⁸ Russell Reynolds, and Haig. The latter writer advances, as three separate arguments in its favour, (1) the clinical relation between the two; (2) the fact that megrim is held in check by an anti-gouty treatment; (3) that it is benefited by a diet poor in nitrogen. His investigations enable us to give a rational explanation not only of this connection, but also of the curious fact that an attack of megrim may suddenly disappear on the supervention of arthritic gout. The urate, as he puts it, cannot be in two places at once, and with its sudden deposition in the joint, it is rapidly cleared out of the blood, the headache disappearing.⁹

Broadbent points out that megrim tends to diminish with age, and he has "seen cases in which migraine lapsed with age, when the formation and excretion of uric acid continued to be extremely great," facts which he deems militate against the view that it is due to uric acid in the blood.¹⁰

Haig, however, suggests that in the old the condition of the joints is such as to favour the deposition in them of uric acid, they being "probably less vascular and less alkaline than those of the young;"¹¹ and this being the case, gout would tend to take the place of megrim. "Once urates are extensively deposited in the joints, they tend to go on accumulating there, so that the blood is kept pretty free so long as there is no marked and continued fall of acidity; but when the patient becomes old and feeble, acidity falls greatly, and the process is reversed ;

¹ "When the gout suddenly quits the first joint of the great toe or any other joint and a headach arises, the headach is called a gouty headach" ("An Essay on Headachs," Lond. 1825, p. 167).

² Heberden writes of hemicrania, "It will attend the gout, and not be relieved by it" ("Commentaries," 3rd edit., Lond. 1806, p. 93).

³ *Op. cit.*, p. 86.

⁴ Cotin refers to the fact that the ancient authors point out that gouty headache generally affects one half of the head ("De la Céphalalgie," Paris, 1847, p. 27).

⁵ *Lancet*, 1874, vol. i., p. 538, *et seq.*

⁶ "Diseases of the Nervous System," Lond. 1883, vol. i., p. 695.

⁷ *Gulstonian Lectures*, 1858.

⁸ "Diseases of the Nervous System," Lond. 1883, p. 551.

⁹ *Op. cit.*, p. 81.

¹⁰ "The Pulse," Lond. 1890, p. 177.

¹¹ *Op. cit.*, p. 143.

there is no gout but an excessive excretion of urate, and the signs of uric-acidæmia—headache, depression, slow pulse, etc.—are severe and well marked.”¹

Jonathan Hutchinson has recorded a case of neuralgia of the scalp, which he regarded as of gouty origin. The patient early one morning was attacked over the middle of the left parietal bone with a pain which “spread out somewhat like a coruscation of sheet lightning.” It passed forwards to the forehead, and backwards to the occiput. Two or three such paroxysms of a few seconds’ duration would follow in quick succession, the intervals afterwards lengthening out to half an hour or so, but in the evening again becoming more frequent and more prolonged. On the previous day he had indulged in more meat and wine than usual, and on the day of the neuralgic attack his ankles and wrists ached and were puffy, and his urine deposited uric acid. Hutchison prescribed a full dose of bicarbonate of potash at bedtime, and the next morning nothing remained but a slight ache on the affected side of the head. He was inclined to regard the pain as periosteal.²

The following case is perhaps worthy of citation in this connection :

M. æt. 45. Has had articular gout on and off for twenty years. Arteries somewhat thickened ; tension high. Has practically never suffered from headache till the last two or three days, during which he has had a localised pain in the right parietal bone.

J. Russell Reynolds writes : “Some of the most intense head-pain that I have met with has been of this character [*i.e.*, gouty], and has been relieved by treatment of an anti-gouty description. The special features are pain on one side of the head, usually parietal or occipital ; ‘grinding’ habitually ; but forced into almost intolerable severity by movement,”³ over-sensitive nerve-points and tenderness of the scalp being absent and the pain being unaffected by position and food, but relieved by rest.

Sir Dyce Duckworth thinks that headache is one of the irregular manifestations of gout in women. “It may be very severe and distracting, or there may be little more than muzziness in the morning, or fleeting tightness felt in various

¹ *Op. cit.*, Lond. 1890, p. 82.

² *Brit. Med. Jour.*, 1886, July 10, p. 61.

³ *Ibid.*, Dec. 15, 1877, p. 842.

regions at different periods of the day. Stooping position aggravates it. . . . Again, great tenderness of the scalp is noted in certain cases, especially marked over the vertex, where the slightest contact of the hand gives exquisite pain.”¹ I have pointed out on another page that tenderness of the scalp is exceedingly common in women.²

A number of writers have described “arthritic headache,” meaning by this term sometimes rheumatism, sometimes gout, but their descriptions are as a rule equally difficult of identification with what one has observed in either of these diseases. Thus, Harvey³ writes of an “arthritic” headache, which generally occurs among those in whom gout fails to show itself in the ordinary way, and which affects the females of a gouty family more readily than the males. The symptoms he gives are: a sense of fulness in the head, vertigo, tinnitus, confusion of thought, interference with vision, flushings in the head, excessive acuteness of hearing, tenderness and “pain of the hair” and heat of scalp, which is otherwise uncomfortable. This group of symptoms is very common at the climacteric, but I do not find any evidence in favour of its being rheumatic.

¹ *St. Barth. Hosp. Reports*, Lond. 1879, p. 104.

² See part iii., chap. ix.

³ *Provincial Medical and Surgical Journal*, 1851, pp. 565, 674. Pariset has a few remarks on gouty headache, *op. cit.*, p. 423.

CHAPTER XXVI.

RHEUMATISM.

THE terms "rheumatic" and "arthritic" headache have been used very obscurely, and it is generally quite impossible to identify these headaches from the descriptions given. Many writers, by "rheumatic" headache, apparently mean headache of the extra-cranial tissues, notably the fibrous, such as the pericranium and aponeurosis of the occipito-frontalis and the muscles of the neck, while some have supposed that the dura mater may occasionally be involved, the cause of the inflammation being catching cold. Thus Copland¹ states that headaches of the rheumatic type are caused by exposure to cold and damp, by uncovering the head while perspiring, by sleeping on a damp pillow, or by a draught from an open window, and that the pain involves the aponeurosis of the occipito-frontalis and temporal muscles (the cerebral membranes being sometimes congested), and may extend down the neck to the shoulder or to the face. In these observations he is to a large extent following Weatherhead, who further remarks: "When the cold falls on any particular spot, there the chief pain is felt; for instance, if from sitting directly under an open skylight the pain attacks the crown of the head; when the cold current of air comes in contact with the side of the head, hemicrania, as it is called, is produced; and falling directly on the eye, rheumatic scleritis is the consequence."² Similarly, Cotin³ asserts that rheumatic headache generally involves the temporal and occipito-frontal aponeuroses, and

¹ "Dict. of Pract. Med.," Lond. 1844, vol. ii., p. 147.

² *Op. cit.*, pp. 82, 83.

³ "De la Céphalalgie," Paris, 1847, p. 27.

that it sometimes arises from a chill. Léon Colin¹ refers to the rheumatic pains felt in the white fibrous tissue of the scalp, and he contends that these are predisposed to by the fashions of alternately covering and uncovering the hair, and of having it cut at long intervals; also by baldness. In another passage he refers to *epicranial rheumatism*, or pain attacking the aponeurosis of the occipito-frontal muscle, and caused chiefly by the action of cold, especially just after the hair has been cut. It is common, he says, in the north of Europe and in England.² I am familiar with this headache, though it is not, in my experience, very common. Here are two cases:

Pain in the occiput and face, felt the day after washing the head and not drying it properly.

Cervico-occipital headache with stiffness in the neck, attributed by the patient to sitting in a draught.

Most writers on "rheumatic" headache regard tenderness of the scalp as very characteristic, if not an actual criterion of it,³ but according to my observations this symptom, so

¹ "Dict. Ency. des Sciences Méd.," Paris, 1873, Art. Céphalalgie.

² A writer in the *Jour. der Pract. Arzneykunde*, Jena, 1795, p. 171, says the pain may involve the pericranium or dura. Vaughan ("Essay on Headachs," Lond. 1825, p. 100) is inclined to place it in the aponeurotic expansions; he thinks the dura mater may also be affected and the tendons of the straight muscles of the eyes, causing pain during movement of them. Elliotson (*The Lond. Med. Gaz.*, Dec. 29, 1832) says that the pain may extend from the head to the face and the neck; the dura he supposes to be only occasionally affected. Like other authors, he gives signs by which extracranial may be distinguished from intra-cranial rheumatism. For instance, in the former the pain, he says, is worst at night, while in the latter it is worst in the morning from the congestion of the brain caused by the night's rest in the recumbent posture.

References to rheumatic headache are made by writers of later date. Schobelt ("Tract. de Hemicrania," Berlin, 1776, quoted by Labarraque, *op. cit.* p. 23) thought that headache generally depended upon rheumatism of the head. Klein (Labarraque, *op. cit.*, p. 19 n.) wrote, "Dolores capitis saepe signum sunt arthritidis praenuntium." Whytt also mentions rheumatism as a cause of headache. Selig describes the case of a man who was severely afflicted with "rheumatism of the head" ("Observationes Medicae," Lipsiae, 1795, p. 175). See also *Jour. der Pract. Arzneykunde*, Jena, 1800, Band ix., part iv., p. 119 *et seq.* I do not find any mention of rheumatism as a cause of headache among writers earlier than the eighteenth century.

³ Thus Sieveking (*Med. Times and Gazette*, 1854, vol. ii., p. 209), writes that the pain in the rheumatic headache is generally thought to involve the

frequently accompanying the headache to which Copland's description applies, has little diagnostic value, most headaches, of whatever nature, being accompanied by it. It is indeed only when the tenderness is so exquisite that the patient winces on the slightest contact, the tenderness increasing with every increase of pressure, that we can with any degree of probability diagnose effusion into the extra-cranial tissues. This second qualification is necessary because, if the tenderness is not aggravated, and more especially if it is diminished, with increase of pressure, it more probably depends upon functional causes.

I may remark, in passing, that while tenderness often accompanies a headache occurring in a rheumatic subject, it may be absent, though of course such a headache is not necessarily rheumatic. The following cases show the varying relations between scalp-tenderness and headaches of this description :

F. cet. 13. Mitral disease. Rheumatic pains in joints. Headache. Scalp has been for a long time tender; never could bear to have her hair combed.

superficial structures of the head and to be accompanied by tenderness and puffiness, but he thinks he has seen cases in which the dura mater was involved also.

Handfield Jones ("Functional Nervous Disorders," 1870, p. 421) states that rheumatic headache is attended by a feeling of tenderness on tapping the head, that it gets worse at night, and is increased by the warmth of the bed.

According to A. A. Smith (*The Med. Record*, 1876, p. 503), it is characterised by tenderness of the scalp, which is increased by pressure and movement.

A. H. Hamilton (*Phil. Med. Times*, 1874-5, p. 290) refers to the superficiality of the pain and the tenderness of the scalp in rheumatic headache, which, he adds, is rare.

Wright ("Headaches, their Causes and their Cure," Lond. 1877, p. 39) mentions scalp-tenderness as one of the signs of rheumatic headache.

R. Ross ("Diseases of the Nervous System," vol. i., p. 691; see also Erb, Ziemssen's "Encyclop.," vol. xi., p. 141) describes rheumatic headache as a violent and tearing pain localised in the muscles of the head, or in the fascia of the occipito-frontalis, often attended by tenderness and commonly brought on by exposure to cold.

Lauder Brunton ("Disorders of Digestion," p. 110) says that rheumatic headache is widely diffused, and that it is attended by tenderness, which may be very great.

Symes Thompson (*Med. Press and Circular*, 1878, p. 500) refers to the scalp-tenderness which may accompany rheumatic headache; also to its superficial character.

P. Chorea. Pains in knees and right forefinger. Suffers from occipital headache, chiefly at night. No tenderness.

M. æt. 36. Been in hospital with articular rheumatism. No headache, but suffers from great tenderness of the scalp.

While it is very doubtful whether the headaches described by Copland and others as resulting from exposure to cold are in the strict sense of the term "rheumatic," they are sufficiently distinct to deserve to be classed by themselves, and may be provisionally considered under that head.¹ It may here be observed that, in the opinion of many authors, they tend to be aggravated by the warmth of the bed, and to be preceded or accompanied by a sensation of cold in the scalp. I believe I have myself observed this latter association.

Of the headaches which have come under my observation the following appears to me to be justly entitled to be regarded as rheumatic, occurring as it did in a patient who had had two attacks of rheumatic fever, and being obviously due to effusion in the pericranial or superjacent tissues, yet even in this case it is at least questionable whether the affection is of a truly *rheumatic* nature :

P. æt. 24. Has had two attacks of rheumatic fever under my own observation, the first seven years, the second two years, ago. She is liable to pains in the joints, but there has been no arthritic pain during the last six months. Violent headache commenced five weeks ago, and has continued unabated ever since. Patient is somewhat anæmic and very worn in appearance. There is a mitral systolic murmur. The head is perfectly clean, and the peripheries on careful examination show no source of irritation adequate to induce the headache. The pain involves the whole of the crown, forehead, eyes, and sides of the head, being most intense on the left half ; it is very severe behind the ears, especially the left, in the left eye, and over the left side of the forehead, in the latter situation feeling as if it were "right in the bone." It is continuous and "gnawing" in character, but occasionally comes on in sharp paroxysms, like knives sticking into the head. The scalp sweats a great deal during and after a sharp paroxysm of the pain, the perspiration trickling down the neck and forehead. The head is exquisitely tender, especially over the crown, where the pain is

¹ The real difficulty lies in our inability to define what we mean by rheumatism, almost wholly ignorant as we are of its pathology.

most intense, but the occipital region is free from tenderness. The soreness is so marked as to render it practically certain that some effusion into the pericranial or overlying tissues is present, the slightest touch causing the patient to call out. This hyperæsthesia is not of purely nervous origin, for on laying the hands flat upon the sides of the head as gently as possible, and then very gradually increasing the pressure, the pain, far from being relieved, is increased. In short, the hyperæsthesia is just of the kind one gets in dense, unyielding, fibrous tissues into which effusion has occurred; such as the testis when affected by acute orchitis, or the end of the finger attacked with whitlow.

I subjoin a second case of a similar nature under observation :

M. æt. 75. Worker in lead, slight blue line on gums, but no evidence of granular kidney. Has never been liable to headache till the last six weeks. During this time he has been compelled to sit at an open window, and he attributes his headache to the draught playing upon his bald head. The pain involves the whole of the head, and it appears to him "as if two holes were being dug out just above the ears." The pain involves the back of the neck, both shoulders, and both upper extremities, spreading as far as the right elbow and left wrist. The painful parts are tender, especially the head—indeed, so exquisitely tender, that gentle contact with some parts of it excites movements which may almost be termed epileptiform. Salicylate of soda and iodide of potassium have done some good, but the case is decidedly intractable.

We have now to inquire whether rheumatic subjects are prone to headache, and whether they may get head-pain having a pathological kinship with their arthritic pain. Both these questions may be answered in the affirmative. Rheumatic subjects manifest a proclivity to megrim, and may suffer from pain in the head of the same nature as the arthritic pain, although it seems probable that they are less liable than others to most forms of non-megrinous headache.

Megrim and Rheumatism.—Hughlings Jackson has insisted upon an intimate relation between chorea, megrim, and rheumatism.¹ Of 76 patients suffering from chorea, 53 were liable to paroxysmal headaches; in 31 of these the headaches

¹ *Lancet*, 1875, vol. ii., p. 51.

were constantly attended with nausea and vomiting, while in 14 ocular phenomena occurred. Dr. Beaumetz shares his belief that sick-headache may be a manifestation of the rheumatic diathesis,¹ and I have satisfied myself that megrim is frequent among choreics.

It has long been known that gout and megrim are related. Hughlings Jackson's observation on the relation between rheumatism and megrim is therefore doubly interesting, chiming in, as it does, not only with facts already established, but also with Haig's views concerning the kinship between gout and rheumatism, and the nature of megrim itself.

I think it will probably be found that megrim is more often associated with rheumatic chorea than with rheumatism uncomplicated with chorea, though people suffering from the latter form are more liable to megrim than people in general. My observations in regard to this question are not many, but they strongly point to this conclusion. The choreic child, apart from his rheumatic diathesis, has a peculiarly constituted nervous organisation; it is, in fact, the concurrence of the nervous and rheumatic diatheses in the same individual which results in chorea, and it does not therefore seem unlikely that a similar concurrence gives a greater proclivity to megrim than would the rheumatic diathesis alone.

Non-megrinous Headache and Rheumatism.—Our next inquiry must be whether the rheumatic individual suffers from pain in the head similar to that experienced in the joints. The following cases suggest an affirmative answer :

Has not menstruated for three months. During this time rheumatism in wrists, shoulders, ankles, and other joints. The affected joints are racked with a burning, gnawing, scraping pain, which becomes worse in bed, greatly interfering with sleep. During the last two months has suffered from the same kind of pain in the back of the crown, the occiput, and the nape of the neck, the latter being also stiff. The affected regions are tender.

Pains in several joints. The pain in the right elbow spreads upwards, and involves the same side of the neck and head, especially the right mastoid region.

Rheumatoid arthritis (prominent Heberden's nodes). Gnawing

¹ "Leçons de Clinique Thérapeutique," Paris, 1891, vol. iii., p. 137 n.

pain sometimes spreads from the right shoulder to the back of the head. Great tenderness of the affected region.

Pain in left shoulder which shoots down to the fingers, and upwards to the occiput. The latter pain is not so sharp as the former. It is described as "knocking."

In these cases the involvement of the head is clearly due to its proximity to the shoulder-joint. Whether the head is involved in rheumatic pain when the shoulder-joint is not affected we cannot say, but of this we may be sure—that rheumatic subjects are not more liable to non-megrinous headaches than others; an analysis of my cases, indeed, suggests that they are unusually exempt from them. In rheumatic as in other fevers headache may of course be present, but it is not generally severe, and the same holds good of subacute rheumatism. I have been struck by the frequent absence of headache among those who came to hospital with joint-pains:

M. æt. 38. Rheumatic fever five years ago. (Has aortic regurgitation.) Finger-joints distorted; comes for pains in many joints. Rarely suffers from headache.

F. æt. 40. Rheumatic fever one year ago. Now has pains in many joints. Never suffers from headache.

M. æt. 16. Has had rheumatic fever. Marked mitral disease. Not liable to headache.

M. æt. 52. Rheumatic fever twice. Pains; slight swellings in certain joints; never has headache.

F. æt. 38. Swelling and pain in left knee. Suffers from megrim; seldom from other headache.

M. æt. 13. Subacute rheumatism in several joints. Is said never to suffer from headache.

It will be observed from the above, which are taken at random from a large number of similar cases, that headache may be habitually absent in those who suffer from chronic articular rheumatism. Possibly there is something in the rheumatic diathesis which tends to confer immunity from non-megrinous headache, but while this is hypothetical, it is certain that the mere presence of violent pain in any one part renders other parts (the head included) less liable to it at the same time. It is probably for this reason that we do not find violent pains present in the joints and the head simultaneously.

Doubtless a certain degree of headache may accompany arthritic pain, but it is seldom severe; even the intense headache of rheumatic hyper-pyrexia is, I believe, apt to be attended by an abatement of the arthritic pain. That joint-pain tends to confer immunity from headache is suggested by the frequency with which the two alternate:

F. æt. 25. Formerly suffered often from headache. Now has pains in knees and right ankle; no headache whatever since these came on.

F. æt. ? Has pain and swelling in some joints. When the joints are bad no headache; it is often present at other times.

F. æt. 45. Has noticed that her arthritic pains are sometimes easier when her headache is bad.

F. æt. 51. When pains in the joints are severe, is free from headache, to which she is at other times liable.

And here it may be mentioned that not only may headache alternate with joint-pain and with gastric pain—as we saw in a former chapter—but also with other symptoms:

Back is better when headache and eyes are bad.

When the headache abates in severity, a dull pain settles in the chest.

When the headache disappears, patient suffers greatly from giddiness.

The headache has greatly improved since the eczema has broken out.

CHAPTER XXVII.

SLEEP.

THE relation of sleep to headache is highly interesting. It was well brought out in the case of one of my patients who declared that a former headache from which she suffered was relieved by sleep, while that for which she sought my advice was made worse by it. In most instances sleep is beneficial ; an individual has a bad headache, goes to bed, sleeps soundly, and wakes up quite well. Gowers has laid it down as a fairly general rule that a headache which prevents sleep is organic, while one which does not interfere with it is functional ; but this, though true of the minor kinds of functional headache, does not, in my experience, apply to the more severe kinds, the fact being that severe pain wherever situated is apt to prevent sleep. I have notes of several cases of purely functional headache which completely or partially prevented sleep. Thus :

Headache keeps her awake at night.

Shooting pains in head ; no proper sleep for weeks.

Pressing, burning pain at vertex ; keeps her awake at night.

Nursing ; neuralgic headache ; keeps her awake at night.

Is nearly mad with pain in head ; has had no rest for three nights.

Boy ; screams out at night with the pain in his head.

It often happens that though the headache does not prevent sleep altogether, it disturbs it, the patient remaining conscious of the pain, and waking up every now and then with it. For example :

Boy, aged ten ; wakes up at night with pain over the right eye.

Suffers from rheumatism and headache ; headache wakes her up at about 2 A.M.

Is awaked in the night by the pain in the forehead.

Headache wakes her up at 4 A.M.

Will go to bed free from pain, but wakes up in the middle of the night with it.

Pain wakes him from sleep all of a sudden.¹

Sometimes a very brief sleep will cure a headache. Thus Liveing tells us that in a few cases a short sleep will stop an attack of megrim;² and Kent Spender writes, "a half-hour's nap is a good old-fashioned remedy for a post-prandial headache."³

Here are instances in point :

If she can sleep for ten minutes, the headache gets better.

He sleeps off his attack of megrim.

The megrim is removed by a night's sleep.

Is much better if she can fall asleep in the upright posture.

Non-megrinous headaches also may be benefited by sleep :

After being asleep for a short time, the pain sometimes leaves her.

Wakes up at 3 A.M. with headache ; if she can sleep, it goes ; if not, it lasts all day.

Ill-effects of Insufficient Sleep.—Just as headache may be relieved by healthful sleep, so likewise may it be induced or aggravated by insufficient sleep, a fact alluded to by the older writers. Thus, according to Haly Abbas, "protracted watchfulness induces headache by occasioning a corruption of the food in the stomach,"⁴ and in like manner C. Aurelianus and many subsequent writers allude to the influence of prolonged vigils in setting up headache.⁵

Ill-effects of Sleep.—But while sleep has, as a rule, a beneficial effect on headache, the result may be quite otherwise.

It very commonly happens that a slight doze in the middle of the day induces headache. Thus :

If she dozes a little in the middle of the day, the head feels heavy and aches when she wakes.

¹ Tissot relates a case of megrim in which the patient was waked in the night with the pain ("Traité des Nerfs," p. 385 ; quoted by Liveing).

² *Op. cit.*, p. 35.

³ *Assoc. Med. Jour.*, Lond. 1854, p. 308.

⁴ Paulus Ægineta, *op. cit.*, p. 304.

⁵ *Op. cit.* See also Fordyce, *loc. cit.*

Willis particularly calls attention to the tendency of a midday sleep to bring on headache.¹ This tendency of sleep is often strongly manifested in megrim. When an attack of megrim is threatening, heavy sleep—the disposition to which is sometimes a premonitory symptom of the seizure—will in some cases precipitate the attack, whereas if the sleepiness be resisted, it may be warded off. Liveing instances a patient who suffers from drowsiness in connection with her megrim, and who always awakes worse if she allows herself to sink into a profound sleep.² Wilks writes, “I do know that the warding off of sleepiness may prevent headache I have been frequently told by my patients that ‘forty winks’ after dinner will allow them to have a wakeful and bright evening, but the loss of this will render them sleepy and dispose them to seek their bed. They then sleep heavily, and awake with a headache; or if after a walk or exertion they should feel tired and sleepy, and fearing the accustomed headache, they have taken a cup of coffee or tea to counteract the sleepiness, they have escaped the attack. This is much my own case, in which also the converse is true, that being kept awake all night or several nights would not produce a headache.”³ J. Kent Spender’s case is very instructive in this connection. “I always,” he writes, “felt particularly well on the day before the attack. . . . It was most fatal to have a good night, *i.e.*, a long and deep slumber; and so my first preparation was to put off going to bed as long as possible, and if that ghostly thing rang, called the night-bell, I welcomed the peal as my truest friend. My invariable rule was to keep sleep at bay as much as possible, however tired I might be; an almost sleepless night would dash aside the coming headache.”⁴

I have frequently known simple, non-megrinous headaches result from excessive sleep—an extra hour in the morning, for instance. Such cases as the following, too, are not uncommon. An individual wakes, let us say, at 6 A.M., and feels inclined to get up, but this being earlier than his usual time for rising,

¹ *Op. cit.*, p. 107. See also Vaughan, “An Essay on Headachs,” Lond. 1825, p. 149.

² *Op. cit.*, p. 143.

³ *Op. cit.*, pp. 551–2.

⁴ *Brit. Med. Jour.*, 1884, vol. i., p. 1145.

he elects to stay in bed, and falls asleep, to wake later with a headache,—a result all the more likely to occur if his second sleep has been light and fitful. I believe more people suffer from too much sleep than is generally supposed, and that the inclination to indulge in another nap near the hour for rising should generally be resisted. Excessive sleep was reckoned as a cause of headache by the ancients, and by Haly Abbas was believed to work its ill-effects by filling the brain with “vapours.”¹ As has happened with so many other of their theories, the idea has come down to within comparatively recent times.²

The influence of sleep in causing headache is perhaps best seen in those numerous cases in which the pain occurs on waking in the morning. This is the time at which megrim generally starts,³ and it is very common for simple, non-megrimous headaches (as most people who suffer from them have probably noticed for themselves) to occur at the same time. Such headaches generally pass away in an hour or so after breakfast or the morning walk.

Headache which occurs on waking may be induced by the act of waking itself, which is known to affect the nervous system profoundly. Especially may a sudden waking bring it on. Labarraque⁴ mentions the case of a lady in whom megrim was always brought on by awakening her before

¹ Paulus Ægineta, *op. cit.*, p. 354.

² “Somnus nimius aeque ac vigiliae inimicus est, ille namque sensibus stuporem invehit, capitiq[ue] gravitatem, quâ omnis actio torpet: hae eruditatem inducunt, alimentum subtrahunt . . . sicut docuit, Celsus” (“Hist. feb. mil et de Hemierania,” Lond., 1758, p. 95). “Somnus, aut vigilia medioeritatem nimium excedentes. In multo enim somno, transmissa ad caput materia, exhalare transpirareque non valet, in somno nempe cutis constipatur” (“Archipathologia,” P. E. Montalto, Lut. 1614, p. 58).

³ See Liveing, *op. cit.*, p. 43. Willis relates the case of a woman who was “wont sometimes to be troubled many days, yea weeks, every day as soon as she awaked in the morning, with a most cruel headache, afflicting her for three or four hours. . . . The pains of the head rather followed after sleep than were healed by it, the reason seems to be, because in the morning headache the morbid matter resided in the nervous juice, whose more notable erudity, and fuller aggestion about the head, happen immediately after sleep,” *op. cit.*, p. 124.

“Some headaches,” writes Heberden, “are sure to be felt just after sleeping” (“Commentaries,” Lond. 1806, 3rd edit., p. 94).

⁴ *Op. cit.*, p. 25.

her accustomed time, and I have more than once seen simple headache thus induced. On the other hand, the headache felt on waking may have been present before waking, though not perhaps to the individual consciousness; this is proved by the fact that the patient may, as we have seen, be waked during the night by the pain.

We have next to inquire how far headaches of this latter description—*i.e.*, such as are not caused by the act of waking—are induced by the condition of sleep, and how far they are independent of it. The fact already mentioned, that resistance to sleep will sometimes ward off a threatening headache, proves that sleep may play a part in their causation, and in considering its influence on the nervous system, we must bear in mind that there are several different kinds of sleep. It may be healthy or unhealthy, and it is of course the latter kind chiefly which predisposes to headache. Some people, as every physician knows, habitually wake in the morning feeling ill: they are “shaky in their nerves,” have headache, are irritable and depressed in spirits; but as the day wears on they improve, feeling best, and indeed often quite well, in the evening. In such cases the night sleep, though it has no doubt to some extent restored the nervous system, has at the same time left it in a highly irritable state.¹ In some the ill-effects, including the headache, may be caused, as Wright points out, by an ill-ventilated bed-room; but this is certainly a very minor factor in the vast majority of cases. Nor can Haig’s suggestion that the morning “alkaline tide” (accompanied, as it probably is, by a rise in the alkalinity of the blood) leads to depression, headache, irritability, etc., by causing an excess of uric acid in that

¹ “It is in the early morning that depression of spirits is liable to be at its worst in nervous debility, so called; or there is the morning headache which is relieved by the bath and breakfast, or wears off as the day advances; or the subject of this affection is more tired on waking up than on going to bed” (Broadbent, “The Pulse,” p. 76). Maudsley observes, in respect to melancholia, “It is remarkable, too, that a good night of sleep is sometimes followed by a worse state of things than is a sleepless night: the sleep has seemingly restored more sensibility to feel the sufferings and more energy to express the distress in conduct” (“The Pathology of Mind,” Lond. 1879, p. 379). But seeing that exactly the same fact applies to headache, irritability, etc., it seems to me unwise to attribute the ill-effect to an improvement in the nervous system, which, in effect, is what Maudsley does.

fluid, be the whole explanation; for if the individual wakes up in the small hours of the morning, long before the alkaline tide has set in, he may experience exactly the same symptoms. Further, as we have seen, headache may result from a quite short sleep in the middle of the day, and so also may irritability. Every mother knows that her baby is apt to wake up irritable, especially if it has been accidentally aroused, and not "had its sleep out." We must therefore conclude that sleep *per se* is capable of causing irritability of the nervous system. Of course much depends upon the kind of sleep; but when a long night's rest leaves the nervous system in an irritable state, we may, I think, assume that the sleep has not been healthy. Sound it may have been—indeed, too sound—for there is a morbid variety of sleep which we may term torpid, from which the individual is with difficulty aroused, and on waking from which his body and limbs feel heavily weighed down, as it were, on the bed. Such sleep, though heavy, is broken; the individual half awakes every now and again to a dim consciousness of his torpidity, and when the wonted time for rising arrives, he is loth to get up, and, if he followed his inclination, would sleep half through the morning. It is normal for children to sleep heavily, and for some adults; but when an individual who is habitually a light sleeper suddenly finds himself sleeping thus, and more especially if in the manner above described, we must regard it as morbid. I am familiar with this torpid sleep, which is due, I imagine, to blood-poisoning, and I have observed a tendency for it to be followed by morning headache. We cannot, of course, logically conclude that the sleep is in such cases the cause of the headache, for the two may be results of a common cause; but I am inclined to think that it at least has a share in causation, for in some of these cases it is probable that no headache would have occurred if the individual had not slept. It is, however, certain that headaches which begin during sleep may have a quite independent origin: it is possible, that is, that they would have occurred even if the individual had kept awake instead of falling asleep.

CHAPTER XXVIII.

INSANITY, EPILEPSY, HYPOCHONDRIASIS, HYSTERIA.

Insanity.—Works on insanity make, practically, no mention of headache as a symptom of it.¹ Dr. Bevan Lewis, to whom I applied for information on this subject, has kindly written as follows: "The fact that headache is scarcely ever, if at all, mentioned in works on insanity is, I believe, explained by the rarity of this as a symptom or accompaniment. I need not here of course indicate the exceptions—cases of insanity accompanying organic brain disease, softening from plugging, tumour, encephalitis, meningitis, and, in particular, the headache (severe) of general paralysis. Your question, as I understand it, refers wholly to simple insanity; here it is certainly a most uncommon symptom. But in the more convulsive psychoses we get deranged sensations in the head—not *pain*—such as 'tenderness' of the scalp, a feeling 'of fulness of the head,' of a 'tight girdle round the head,' a 'fine crackling or fermentative movement inside the head,' almost invariably referred to the vertex, also a 'sense of heat within the skull.' . . . Then, again, patients describe a painful feeling, as 'though something had given way within the head,' as sudden, as painful, and as transient as an 'electric shock.'

"Nor do I trace headache as a common premonitory symptom of insanity, but rather the condition of dysæsthesia alluded to above."

So far as my own limited experience of insanity goes—I give

¹ I may here mention that Hippocrates has remarks on headache occurring in association with abnormal conformation of the skull ("Epid.," l. vi. n. 1, on the authority of Ploucquet, *op. cit.*), and Morgagni also records a similar case (*op. cit.*, Ep. 1, Art. 14).

it with some diffidence—it bears out Bevan Lewis's assertion that abnormal cephalic sensations of the kind described above—cephalic dysæsthesiæ—are common prodromal symptoms. I have also observed the most distressing headaches in those who have been insane.

Dr. Clay Shaw is of opinion that "headache is very common among the insane, although they rarely talk of it unless asked." He thinks it is often a sign of intra-cranial pressure,¹ which it is now well established is excessive in general paralysis of the insane. The signs of such pressure are "pain, bulging, spurting of fluid when the tension is relaxed and the flattening of convolutions," and, he continues, "all familiar with the treatment of general paralysis know how beneficial is the medical treatment directed to the lowering of tension, such as bleeding, free use of purgatives, digitalis, &c.; whilst, on the other hand, excitement, stimulants, too long-continued exercise, cause increased pressure and aggravate the disorder."²

Again, he says of pressure,³ "headache would appear to be one of the most prominent signs, although not constant. It must, however, exist oftener than patients confess, for the insane are notably bad at describing symptoms, and very often their statements cannot be relied on. Looking at the thickening of tissue, the evidences of congestion, the arterial tension, and at times the fusion of parts, it is impossible to avoid the conclusion that pain must be present in the majority of cases."

Epilepsy.—At first sight one would expect headache to be common among the epileptic, but this does not appear to be the case. Léon Colin expressly states that it is absent during the intervals of the fit, but that there may be heavy pain for some hours after it.⁴ The following cases accord with this statement:—

F., æt. 36. Has not suffered from headache all her life except after a fit. Then has "silly," heavy pain.

F., æt. 41. Suffers from headache after the fits; the pain since the last fit has been of several days' duration.

¹ See paper by Dr. Shaw in *St. Bartholomew's Hospital Reports*, 1892.

² *Ibid.*, 1892, pp. 55, 56.

³ *Ibid.*, p. 65.

⁴ "Dict. Encyc. des Sciences Méd.," Paris, 1873, p. 37, Art. "Céphalalgie."

Wilks makes special allusion to the rarity of headaches among epileptics. "Epileptics," he writes, "do not suffer from headaches;" and again, "I know several 'headachy' families, but have not found that any members suffer from epilepsy."¹ On the other hand, Labarraque contends that epileptics "are often affected with most intolerable headaches which may simulate migraine,"² and I myself have notes of more than one epileptic who suffered from headache in the intervals of the fit. Thus:

F. æt. 9. Has been for some years liable to genuine epileptic fits. Bites the tongue and passes water, and sometimes the motions, in the fit. The attacks have of late been increasing in frequency. The patient is very liable to headache. There is no optic abnormality.

On the whole, however, my slight experience in the matter lends some support to the opinion of Colin and Wilks. In most of my cases the headache was vertical. In the following the fit was preceded by acute headache:

M. æt. 23. He has cutting pain in the forehead and crown. After this there is a sound of rushing water and dizziness, when he loses consciousness. The patient also suffers headache independently of the fits.

It is generally held that megrim and epilepsy are related. Wilks has ably contended against this view, but in spite of his high authority the evidence appears to be decidedly in favour of a connection. While, however, the two are probably related, there would seem to be a certain antagonism between them, so that the presence of the one to a large extent confers immunity from the other. The child of insane parentage is much less liable to become insane or to develop epilepsy if megrinous than otherwise.

Hypochondriasis.—It is not my intention to enter here into the highly interesting but little understood condition termed hypochondria. It must suffice to say that subjects of it are very liable to headache, and especially to abnormal sensations in the head. I think I am right in saying that these latter

¹ "Diseases of the Nervous System," London, 2nd edit., p. 552.

² "Essai de la Céphalalgie," Paris, 1887, p. 46.

are the most common and obtrusive of the many forms of dysæsthesia to which the hypochondriac is liable.¹ And here let me observe that it is a very great mistake to characterise these morbid sensations as “fancied” and “imaginary.” Such words suggest that the sensations are not actual—that the individual only “fancies” or “imagines” that he experiences them, a view which ill accords with the fundamental facts of psychology. He either feels them, or he does not feel them. If the latter, he is a malingerer; if the former, the sensations are as real to him as anything can be; our own mental states are, in fact, the *only* realities to us.

Hysteria.—The older writers frequently allude to the headache of hysterical subjects, but the term “hysteria” was used by them in a much wider sense than it is now. It seems, indeed, to have been applied to each and every variety of functional nervous disturbance occurring in the female. Thus there is reason to believe that the simple nervousness of the chlorotic was regarded as hysterical. Nowadays we attempt to discriminate between simple nervous debility (or, as it has come to be called, “neurasthenia”) and hysteria, and the tendency is to limit the application of this latter term more and more. We are, however, still very far from being able to use it in a very definite sense.

It is certain that headache is exceedingly common among neurasthenic women—they furnish, in fact, the most common examples of chronic headache—but I do not find that it is a very special feature among the genuinely hysterical. Briquet, however, in his work on hysteria, mentions headache as very frequently occurring in this disorder, being present in 300 out of 356 cases. He thinks the pain essentially attacks the extra-cranial muscles. Clavus occurred in two cases only.²

¹ Plouquet makes two references to hypochondriacal headache; *op. cit.*, vol. i., p. 216.

² See further on this subject, part iii. chap. v. Plouquet gives several references; *loc. cit.*; Copland (“Diet. of Med.,” Lond. 1844, vol. ii. p. 148, describes both the hysterical and the hypochondriacal headache.

CHAPTER XXIX.

FEVER. MALARIA.

ALL febrile states are apt to be accompanied by headache. It is generally very marked at the onset of the acute specific fevers, especially typhus and typhoid. In the former it "usually ceases, or greatly abates, with the advent of delirium about the eighth day,"¹ and in the latter, as is well known, severe headache, usually frontal, is one of the most constant symptoms during the first week, generally ceasing, as in other fevers, when delirium begins. In the initial stage of small-pox, headache is scarcely ever absent, but usually subsides as the eruption appears.² It is very severe, sometimes causing the patient to cry out, and it generally involves the entire head, though it may be limited to the forehead.

The element of idiosyncrasy must not be lost sight of in considering these headaches. An individual with a highly strung nervous system is much more likely to suffer from such nervous disturbances as headache and delirium during fever than one with a more stable nervous organisation. Thus it is that the slightest rise in temperature almost invariably causes headache in members of headachy families, while there are others who will pass through a violent and protracted fever without complaining of any urgent head-symptoms.

The pathology of pyrexial headache is not clear. Brunton thinks that it may in part result from a peculiar state of the eyeballs in fever. These are then often acutely congested, and it is quite possible that this condition may be an occasional factor in the production of the pain. Another, probably, is the

¹ "The Continued Fevers of Great Britain," Murchison, Lond. 1884, p. 157.

² Curschmann, Ziemssen's "Encyclop.," vol. ii., p. 346.

poisoned state of the blood, though how the fever-poisons act it is impossible to say. Finally, the activity of the cephalic circulation during the early stages of acute fever may take some part in causation; at all events the active pulsation of the cerebral vessels aggravates, if it does not originate, the headache.

But whatever its pathology, it is certain that the tendency to pyrexial headache depends not merely upon the *height*, but also upon the *kind* of the fever. This is proved by the fact that the tendency to it varies in the different specific fevers, as well as by the fact that its intensity in any particular fever does not necessarily rise and fall with that of the fever. Thus, in typhoid the headache may begin to abate before the fever has reached its climax, and I have noticed cases of very high temperature, as, for instance, in pyæmia, when there has been no head-disturbance whatever, nor any reason to believe that the immunity was due to idiosyncrasy.

Malaria.—The older writers make frequent mention of malarial headache, and it is evident that it was very common in their time.

Not only is headache a pronounced symptom of the ague-paroxysm, but it is, as is well known, very apt to attend the malarial cachexia, notably in the form of “brow-ague.” In this the pain over the supra-orbital region, generally of one side, tends to assume an intermittent type, and is peculiarly amenable to quinine and arsenic, the former in large doses. It is occasionally met with in the fen districts of this country, but is evidently rapidly dying out. On the other hand, I have seen many cases of severe cephalic neuralgia in those who have contracted ague abroad.

John Macculloch¹ has shown that the malarial poison has a peculiar influence on the nervous system, and that many neuroses may be excited by it. Of these hemicrania is certainly the most frequent, but there seems little doubt that asthma, angina, and tic douloureux may have a malarial origin. He points out that though brow-ague is generally

¹ See his valuable work, “An Essay on the Remittent and Intermittent Diseases, including Marsh Fever and Neuralgia,” Lond. 1828.

periodic, it is not necessarily so, and may occur at irregular times, when its true nature is apt to be overlooked. Further, he has known "the headache and ague-fit to occupy alternate days," so as to constitute what would appear to be a double tertian.

Vomiting may attend the intermittent headache, just as it may an ordinary ague-fit, in either case terminating the attack, and such cases it is obvious may be easily taken for bilious headache.

Confusion of thought, in severe cases passing into actual delirium, is apt to occur during the pain, and in like manner there may be profound emotional change; also giddiness. It would appear that the fit may manifest itself solely in an emotional change, such as irritability, depression, or fear. There may be "an unaccountable sense of fear, rather than of anxiety, but sometimes of both united, coming on at the same period of the day, but very generally at night, and above all upon the first attempt to sleep. And this sense of fear is described as being sometimes so violent or perfect, as to produce that trembling in the limbs which notoriously attends this passion, although the patient is in his bed, and can assign or discover no cause for fear."¹ Macculloch believes that vertigo may, similarly, be the sole manifestation of the fit.

The same authority holds that when headache occurs in a masked ague-fit the pain corresponds to the hot stage, the carotids pulsating and the head feeling hot, while before the pain the patient may be actually conscious of a cold stage. The character of the pulse points, he contends, to the same conclusion. On the other hand, Liveing holds "that when megrim occurs as a masked intermittent, it corresponds with the *cold stage*,"² and the same opinion is shared by Calmeil.

Not only has the malarial poison a specific influence on the nervous system, but it may also affect it by inducing anæmia, to which much of the neuralgia which attends the malarial cachexia must also be attributed.

¹ *Op. cit.*, part i., p. 365.

² "On Megrim," etc., Lond. 1873, p. 413.

PART III.

SYMPTOMATOLOGY.

CHAPTER I.

INFLUENCE OF HEADACHE UPON THE SPECIAL SENSES, THE EMOTIONS, AND THE INTELLECT.

I HAVE had occasion in Part II., while discussing the causes of headache, to say something of its symptoms; as when, for instance, I have described headache due to anæmia, gastric disturbance, renal disease, etc.; and I have sought to show that, while the nature and grouping of the manifestations may suggest the pathogenesis, we can never rely upon them alone for a proper diagnosis. In these incidental allusions, however, I have by no means exhausted the symptomatology of headache, and it will now be necessary to enter into this subject in some detail, with the reservation that what has already been said will not be repeated. By the "symptomatology of headache," I refer to those symptoms which are the direct outcome of the headache. These, though essentially cephalic, may involve other regions besides the head. To make the point clear we will suppose an individual has headache and other symptoms. These other symptoms may be the direct result of the head-pain; or they may belong to some disease of which the head-pain is itself a symptom; or, finally, they may stand in no causal connection whatever with the head-pain. If he complains that during the height of his headache he breaks out into a profuse perspiration, that his sight is interfered with, and that he is unable to think clearly, we may safely regard these symptoms as consequent upon his headache;¹ if he is highly anæmic, we regard his breathlessness and palpitation, not as symptoms of his headache, but of the anæmia whereof the headache is itself, probably, the result; while if he has habitual dyspepsia,

¹ Or more accurately, "upon that condition of nerve-matter which underlies his headache."

while the head-pain only comes on after reading small print, we should be inclined to say that there is no causal connection between the two.

In the following remarks on symptomatology I shall, then, only enter into a consideration of those symptoms which appear to me to be the direct outcome of headache. Megrin is an exception. It would be manifestly incorrect to regard the high arterial tension, shivering, and scanty urine, which are wont to attend the seizure, as the outcome of a pain in the head. The term *megrin*, however, does not imply headache only : it connotes a highly complex disorder of which the headache is but one among many manifestations.

MENTAL EFFECTS OF HEADACHE.

The mind is often profoundly affected during headache. We may consider these mental effects under three heads : those referable to (*a*) the special senses, (*b*) the emotions, and (*c*) the intellect.

(*a*) *Influence of Headache on the Special Senses.*—Severe headache tends to deaden sight, hearing, taste, and smell. It is true we cannot always get evidence of this upon inquiry, but we should probably find it to be the case if we had a test by which we could actually gauge the acuteness of these sensations. The fact that severe pain elsewhere is much less likely to affect them I have attempted to explain by supposing that the cephalic common-sensibility centres involved in headache are more closely connected with the centres of sight, hearing, taste, and smell than are those of the rest of the body, and consequently disturbance in them is apt to spread to the centres in question, and so to affect the sensations (sight, hearing, etc.) belonging to them.

Sight.—Sight is more frequently affected in headache than any other special sense.¹

That it may be affected in megrim is well known, the visual

¹ Celsus gives *oculorum caligo* as one of the cardinal symptoms of cephalæa. Vaughan ("An Essay on Headachs," Lond. 1825, p. 76) contends that Celsus used this term in a general way to denote any affection of sight. The same authority, while alluding to the fact that Celsus notices the affection of only one sense in headache—viz., sight, observes that hearing, taste, and smell may also be affected (p. 77).

phenomena when they occur invariably preceding the pain. Of such cases, minutely described by many authors, I shall take no account here, confining my remarks to visual disturbances occurring during ordinary headache, and not preceding the pain but arising as a result of it. It does not appear to be known¹ how very marked the disturbances often are.

As we should expect, they are most frequent in frontal headache, and especially when the eyes are implicated in the pain :

Frontal ache makes eyes dim (several).

During frontal headache "things go red."

" " " "a skin comes before the eyes."

" " " "things go quite dark."

Has frontal headache, with "mistiness" before the eyes (several).

During frontal ache, sees specks before the eyes, sometimes quite a thick cloud.

When suffering from pins and needles in the eye, sight is affected.

Sometimes, however, the patients assert that the sight is not in the slightest degree affected even during the most violent frontal headache, but it is possible that with an accurate test we should arrive at a different conclusion :

Ache over right eye, but it does not interfere with sight.

Frontal ache, and dull, heavy ache in eyes, but no affection of sight (others like this).

Headache, and pain at back of eyes ; eyesight not affected.

Again, the sight may be affected when the pain is situated in regions of the head other than the frontal :

Vertical pain chiefly ; eyes "go dim" with the ache.

Burning and curious feeling in vertex, during which the eyes go dim.

The visual disturbance in ordinary headache may be produced in various ways. It may, for instance, be due to local changes in the eye-balls (such as vaso-motor spasm, lachrymation, paralysis of the muscles of accommodation) ; or it may be central,² that is, due to the spreading of disturbance from

¹ W. Pelham (*op. cit.*) observed that acid in the stomach is followed by tightness in the upper part of the throat, a dull pain and constriction of the forehead and scalp, a slight *obscurity of vision*, and a strained feeling in the eyeballs.

² See chapter v., part ii.

the cephalic common-sensibility centres to the sight centres; or, possibly, to both combined. In a similar way we may also explain that modification of vision known as photophobia,¹ a well-known accompaniment of headache.

Hearing.—According to Vaughan's experience (*loc. cit.*) deafness, ushered in by tinnitus, is very common in headache, and probably the hearing is more frequently affected in headache than is generally supposed. Though a certain number of patients deny the implication of this sense, others recognise it, and the application of a sufficiently delicate test would probably disclose some alteration in almost every instance. The most interesting cases for observation in this connection are those in which one ear only is involved in pain. Out of seven such cases in which I tested the hearing, in four it was dulled on the affected side during headache:

Neuralgia in the left lower jaw, involving the interior of the left ear and the mastoid region, and coming on chiefly at night. No evidence of aural disease. Greatest distance at which watch-tick can be heard on this side less by six inches than that at which it can be heard on the other.

Pain in the left side of the head, including the left ear. No aural disease. Hearing distinctly diminished on this side.

Pain in the left side of the head, including the ear. When the pain in the left ear is very bad, is quite sure that she is partially deaf in it. Hearing perfect when tested. No aural disease.

Severe pain shooting from the right ear down the right side of the neck and to the right eye, and coming on every few minutes in violent paroxysms. Considerable deafness on this side. After the removal of a large mass of cerumen, the patient complained of hearing "too much" on the affected side, and the paroxysms of pain gradually passed away.

In the last case the dulness of hearing which occurred in connection with pain in one ear was clearly due to a local cause.

¹ In the following passage C. Aurelianus alludes to photophobia among other important symptoms of headache: "*Ac si passio vehemeter cœperit, rubri atque prominentes oculi fiunt, dejectis et conclusis palpebris evitantes lumen, eum lacrimarum fluore . . . et obtusione visus, aurium tinnitu, et difficili auditu.*" "*De capitis passione, quam Graeci Cephalean nominant.*" "*De Morbis Acutis et Chronicis,*" Ams. 1709. Similarly, Stuckens remarks: "*Interdum oculi admodum dolent, et lucis impatientissimi sunt.*"—"De Dolore Capitis," Brux. 1787.

In the three following cases hearing was apparently not affected :

Neuralgia in the right ear and right side of the forehead ; sometimes in the right side of the face. Little pain in the ear at the present moment. Hearing identical on both sides.

Dull pain over the right temporo-maxillary joint, and above the right ear (involvement of auriculo-temporal nerve ?) No difference in the hearing on the two sides.

Shooting pain in right ear. Hearing not affected.

It is not only in those cases in which the ear is the seat of pain that hearing is interfered with. It may be affected when the pain involves the frontal and other regions of the head, even though the aural region does not appear to be especially involved :

Has pain in forehead, parietes (chiefly right), posterior vertex, and upper occiput. Has noticed he " does not catch words so quickly " after a sharp frontal pain as usual. (I should expect the common-sensibility centres of the frontal region to be more closely connected with the centres of hearing than those belonging to the posterior parts of the head.)

Severe headache, but not involving the aural regions especially ; hearing is interfered with during the pain.

The tinnitus which not infrequently accompanies headache generally affects the hearing :¹

When headache is severe, there is a noise in the right ear, " like the sea rolling."

When the pain is bad, hears noises, especially in the right ear ; hearing is then interfered with.

Sometimes hears sounds " like bells " in the two ears during headache.

Has buzzing in the ears with headache ; cannot hear so well then as usual.

Taste.—Vaughan thinks he has known taste affected in headache, and though few of my patients have noticed any such association, one or two have been quite certain that it then became blunted. It would be strange if such were not sometimes the case, seeing how headache may interfere with the appetite. As one patient put it : " I do not eat with so much relish as

¹ " When Celsus treats of sounds in the ears, he mentions a dulness of hearing after pains in the head of long duration," Vaughan, *loc. cit.*

usual when I have the headache ;” but apart altogether from this, we may, I think, assume that the taste is often dulled.

Smell.—I have not observed any diminution in the sense of smell in headache, but I have little doubt that it often occurs.

Observations under the foregoing heads cannot be very satisfactory so long as we have no means of testing for ourselves the condition of the special senses. It is almost impossible to get accurate data from patients, and data of any other kind mislead.

(b) *Influence of Headache on the Emotions*.—Headache is often accompanied by excessive mental irritability. Not only are the special senses, such as those of sight and hearing, very impressionable during it, as shown by the tendency to photophobia, etc., but there is great irritability in the emotional sphere.

Irritability of temper may usher in an attack of megrim,¹ and so also may, as is well known, unwonted buoyancy of spirits, and the opposite condition—depression. Amongst the emotional states which may *attend* megrim, Liveing mentions mental depression, anxiety, dread—a vague, unaccountable fear. Some patients, he tells us, refer to their attacks with horror, shuddering at the very name of them ;² and he makes the interesting remark that fright, which is assigned as a cause of hysteria and epilepsy, may be a part of the disease itself, and that night-terrors in children are closely related with more serious neuroses, such as epilepsy and megrim.³

It is not uncommon for the patient when suffering from a certain kind of headache, to say he “feels as if he were going out of his mind.” This phrase essentially implies, I believe, a peculiar emotional state, though doubtless the intellect is implicated; in some cases it is probably merely a figure of speech expressive of intense suffering. The condition frequently attends vertical headache, especially that variety of it which is so often experienced by the neurasthenic woman. The following are examples :

When head is bad at the top, “feels as if she would go out of her mind.”

“Has a feeling at the crown as if she would go out of her mind.”

¹ Liveing, *op. cit.* p. 113.

² *Ibid.* p. 114.

³ *Ibid.* p. 116. Liveing further insists upon the relation of nightmare, somnambulism, and trance on the one hand, and megrim and epilepsy on the other.

Is then very irritable. Cannot bear the least sound or noise, and feels as if she "would do something rash."

When pain occurs at the posterior vertex, "feels as if she could run right away, or might go out of her mind."

Has curious "irritable pain" on the crown. Has to get up from her work and walk about.

Has pressing pain on the "crown as if she would go out of her mind."

And again, similar emotional states seem indicated by the following expressions:

During pain feels "worried and inclined to scream"; also is forgetful. Is "bewildered" with the pain in the top of the head.

In the two next cases the phrase was probably used to denote intense suffering:

Suffers from such agonising pain that he is afraid he "will go off his head."

"Could scream with the pain in the head; feels as if he were going mad with it."

(c) *Influence of Headache on the Intellect*.—It is impossible to influence the emotions profoundly without also affecting the intellect, which therefore is involved in the group of cases just considered. The intellect may, however, be involved independently of the emotions. In rare instances it remains unclouded, or even seems to become sharpened during headache. I have known this to happen. One patient displayed the nicest intellectual discrimination when racked with severe headache; there was no tendency to mental clouding or weariness. This was a case of simple headache; but, according to Wilks, such intellectual keenness is by no means uncommon during megrim. "It is remarkable in the form of headache of which I am now speaking, how quickened the mental powers often are."¹ The variety to which he is alluding is that in which there is a determination of blood to the head from paralysis of the cervical sympathetics, with a tendency to vaso-constriction elsewhere, as manifested by cold hands and feet.

Liveing, on the other hand,² speaks of the confusion and loss of memory which attend the attack of megrim. He, however, quotes the following passage from Dr. Dwight, showing

¹ "Diseases of the Nervous System," 2nd edit., p. 550.

² *Op. cit.*, p. 107.

that the intellect may be sharpened during the attack :
 "What, perhaps, is a little singular is that the intellect, during the severity of the pain, is peculiarly clear, precise, and capable of making the most minute distinctions upon intricate subjects."¹

But while the intellect may sometimes be sharpened during headache, whether simple or megrinous, it tends, according to my experience, to be clouded in most cases ; and this is, I believe, the common opinion. Thus, Copland defines headache as "pain in the head, with intolerance of sound, sometimes also of light, and *incapability of mental exertion*."² I select the following as showing this effect of headache :

Often suffers from "confused " headache.

Headache "muddles " her, taking memory away.

Suffers from a heavy, stupid, "silly " headache.

When pain seizes her over the left eye, is "quite stupid;" can remember nothing during the attack.

Suffers from sudden pain in the head, with a "muddled feeling."

Suffers from a confused pain in the vertex ; scarcely knows what he is doing.

Has "thick, bewildered " feeling, with headache.

Vertical headache. Then has "dumb " feeling as if he had lost his senses.

Sometimes during the headache, but generally not until it has nearly passed off, has "a stupid feeling, as if she did not know what she was doing."

It need scarcely be said that attacks of confusion may occur without headache. Such attacks are common in women.

Drowsiness is a well-known accompaniment of headache. The following are instances :

Feels heavy and drowsy with headache.

Is generally drowsy with the headache.

Has drowsiness with the pain ; feels as if he wanted to sleep.

Seeing that headache interferes with the powers of thought, one would naturally expect that it would, if long continued, tend to cripple the intellect ; and Weatherhead asserts that the common effect of habitual headaches is to impair the intellectual faculties, and especially the memory.³ On the other hand, some of the most intellectual suffer from repeated

¹ *Op. cit.*, p. 113.

² "Dict. of Medicine," Lond. 1844, vol. ii., Art. Headach, p. 142.

³ "A Treatise on Headachs," etc., 1835, p. 38.

attacks of headache for years—notably from megrim—without any apparent injury to the mental powers, a fact to which Heberden draws special attention. I have already mentioned the case of John Wesley, who, though a great martyr to headache in early life, retained considerable mental vigour at four-score years.

The temporary dulling of the intellect which occurs during headache is essentially salutary, for it tends to enforce mental rest. The headache which results from over-work is a warning of coming danger, and it may be more than this: it may, by rendering work impossible, compel the sufferer to desist from it. Such a headache does for the brain what the agony of rheumatism does for a suffering joint: it secures rest for the part requiring it. Those who, when they have over-worked the brain, do not get the warning headache, or who, even though they get it, suffer no intellectual impairment, run great risk of putting a dangerous strain on the mind. Being capable of long-sustained mental effort they court intellectual breakdown, cases of which are much more common among them than among those whose store of mental force rapidly runs out, or who are compelled by headache to stop work when it becomes hurtful.

Not only is headache a safeguard to the brain: it may also guard the body as a whole against evil. In many it is a very delicate index of bodily health, indicating with unerring certainty that something is amiss. There are some who can only keep free from headache by leading most careful and regular lives. The slightest indiscretion in respect of food, drink, or tobacco, will bring it on; they cannot stay up late, go to the theatre, or expose themselves to any form of mental excitement but they are punished with cruel kindness by this friend in disguise. They are, as it were, forcibly kept within the paths of well-being, and thus it is that the subject of headache frequently lives to a ripe old age.

The headache which comes on with acute disease often serves a physiological purpose, since it helps to enforce that bodily rest which is so helpful to recovery.

But, alas! it must be confessed, on the other hand, that headache is often redundant, racking the sufferer with pain, and serving, so far as we can judge, no good purpose.

CHAPTER II.

INFLUENCE UPON THE PERIPHERAL ORGANS OF SIGHT.

WE have seen that the eyes may be a source of headache; we have now to consider how far, and in what ways, they may themselves suffer during, and in consequence of, headache. It is convenient to treat this subject under the following heads:

1. Abnormal sensations, such as pain, tenderness, burning, in (*a*) the eyeballs; (*b*) the eyelids—that is to say, sensations referable to the ocular distribution of the fifth.¹

2. Local changes in the eye—*e.g.*, lachrymation, modifications in ocular tension, and in the size of the pupil.

1. (*a*) *Abnormal Sensations in the Eyeballs*.—The eyes are frequently involved in the pain of headache,² and it would be strange if they escaped, seeing that they are abundantly supplied with sensory nerves from the superior division of the fifth, from that branch, namely, which is most often affected in headache; and seeing, further, that headache frequently comes through irritation of the eyes.

Pain and other sensations may be felt in the eyes in whatever part of the head the headache is situated, but, as we should expect, they occur especially when the pain proceeds from the frontal and temporal regions (superior division of the fifth). Next to frontal, vertical headache is most frequently

¹ The influence of headache on *sight* has already been considered.

² A fact well known to the ancients. Thus Galen observes that the pain of headache may extend “ad radices oculorum,” the mischief travelling, so he supposed, by direct continuity from the brain. Similarly C. Aurelianus remarks of the pain of headache: “Occupat etiam oculorum radices.” This view may be traced through many subsequent writers. See, for instance J. F. Stuckens, “De Dolore Capitis,” Brux. 1787.

attended by abnormal sensations in the eyes, while the occipital is least frequently. The following may be quoted :

Pain travels from the occiput over the head to the eyes.

Pain involves the left side of the head, left eye, and arm.

Coughing often causes violent pains in the head, the frontal region being most frequently attacked, and with it the eyes :

Has sharp pains in forehead and eyes while coughing.

Can scarcely bear pains in forehead and eyes during cough.

Cough makes eyes ache severely.

Some of the pains felt are described in my notes as throbbing, burning, "like toothache," "like needles," sharp, very bad, terrible, dreadful; but in by far the majority of cases the patients simply complained of the eyes aching.

Tenderness of the eyeballs is not uncommon; thus the eyes are said to feel sore when they are moved or pressed. Other sensations may be experienced,¹ but it will be sufficient here to mention those which may be grouped under the head of "heaviness."² Such are the following :—

Frontal ache; eyes feel "as if they would drop out."

Heavy thick feeling, "as if some one were dragging the eyes down the face."

When pain comes on, feels as if a weight were pressing eyeballs down.

Heavy "dreary" feeling in the eyes.

Headache and weight in the eyes.

In many cases the entire ball appears to be involved in the morbid sensations, but in about one-third it was referred to the back of the eyes :

Ache in forehead and at back of eyes (common).

Vertical and frontal ache affecting back of eyes.

¹ Thus Pelham Warren alludes to "distension and stiffness" of the eyeballs occurring in connection with a form of dyspeptic headache; also to a "strained feeling" in the balls (*Med. Trans. Royal College of Physicians*, Lond. 1813, iv., p. 233), and sometimes a peculiar feeling, as if the eyes were being drawn in and getting smaller, is experienced.

² G. E. Stahl points out that here may be weight over the eyes: "Es drücke ihnen in der Stirn nicht anders, als ob ein Stein darinnen läge; können kaum die Augen dafür aufthun, und ins Licht sehen."—"Medicinæ Dogmatico Systematicæ" &c., Halæ, 1707, sect. ii. p. 683. See also p. 663, where he refers to the sensation of weight in the eyes which may accompany headache.

Aching "like toothache" at back of eyes.

Occipital and vertical ache, pain at back of eyes.

It is of course possible that in these cases the pain was not in the eyeball, but in the back of the orbit. One patient complained of pain in the forehead on the "top of the eyes," and another suffered from soreness at the bottom of the eye, but the eyeball may not have been meant in either case.

(b) *Abnormal Sensations in the Eyelids*.—Whether there is any pain in the eyelids in frontal headache with eye-ache cannot be gathered from my notes. Probably there is. The upper lids frequently feel heavy, and are apt to droop in consequence, but since drowsiness often accompanies the headache, this feeling of weight and drooping of the lids may be due to it alone. In this connection one is reminded of King Henry IV.'s invocation of sleep :

. . . . thou no more will *weigh my eyelids down*,
And steep my senses in forgetfulness ;

and I may remark that one patient used the very expression italicised :

Heavy frontal ache, seems to weigh my eyelids down.

Frontal ache, the eyelids seem pressed down.

2. *Local Changes in the Eyeballs and Eyelids*.—Lauder Brunton has observed increased ocular tension in other headaches than the glaucomic. I have sometimes thought that I have detected plus tension in headaches in which there is soreness of the eyes, and which I have been inclined to associate with hepatic derangement, but of this I am not sure. It is extremely difficult to speak positively in regard to slight modifications of tension ; of this, however, I am certain, that I have seen the soreness without any increase of tension.

I have not been able to detect any change in the disc during headache.

Morton¹ has seen thrombosis in retinal vessels taking place during an attack of megrim. The pupil in megrim may be either dilated or contracted. It is, of course, dilated in glaucomic headache ; I am unable to say whether it is altered in other kinds. The lachrymal glands are often excited to

¹ *Ophth. Review*, March, 1890.

increased action, especially when the pain is violent and attacks the eyes.

The lustre of the eyes is dimmed in most headaches,¹ practically in all except the headache accompanying fever, when it is often unwontedly heightened. This variation in lustre is a valuable index of health. It belongs essentially to the iris, the tint of which is constantly varying, being at one time dull, and at another bright. These differences are well marked in brown eyes, which may change from a dirty yellow, having a sodden appearance, to a rich, warm, glowing tint. In order, however, to gauge the state of a person's health by the lustre of the eye, we must know what is the normal lustre. Its fluctuations are then a very safe guide.

The prominence of the eyeball is another condition which varies considerably in the same individual from time to time. The apparent size of the eye depends chiefly upon its setting in the orbit, the most prominent eye, other things being equal, appearing the largest. When the eye is set prominently the upper lid is fuller than when it is deep-set, there being a greater distance between the edge of the lid and the line or wrinkle above, which runs nearly parallel with it. As the eye recedes, the distance diminishes, and in very deep-set eyes the two lines practically coincide. Now, I have often observed the distance between these lines alter according to the state of health, being greatest in sound health, when the eye is most prominent. But, as in the case of the lustre, so here, we must first know what is the normal condition of the individual before we can detect the abnormal; and thus, while in our intimate associates we can readily detect any variation in the lustre or prominence of the eyes, and so make it a gauge of health, these minute differences occurring in others are often, and necessarily, unnoticed. In headaches the eyeballs are apt to recede, and

¹ Whytt refers to the altered lustre of the eye in headache: "At other times nothing can be observed but that the *eyes want their usual lustre*, and look as if the person had watched long, or drunk too much." ("Observations on the Nature," &c., Edin. 1765, p. 305). The dull appearance of the eyes in headache depends, according to Vaughan, upon (1) deficient secretion between the laminae of the cornea; (2) drooping of the upper eyelids; (3) retraction of the eyeballs within the orbits, owing, he thinks, to contraction of the recti. ("An Essay on Headachs," London, 1825, p. 76.)

sometimes very markedly. This is especially the case in that form of megrim which Eulenburg styled the vaso-constrictor, but I have observed it in ordinary headaches.¹

Fordyce (in his "Dissertatio de Hemicrania," 1758) says that the eye on the affected side appears sunken, and Whytt² remarks that in some headaches "the eye seems to sink within the orbit"; while of late years many writers have referred to the retraction of the eyeball which may occur in connection with an attack of megrim. Thus Eulenburg speaks of "the sunken eye," which characterises the spastic form of hemicrania—that form, namely, which he supposes to be due to the overaction of the cervical sympathetic.³

A word as to the condition of certain small muscles in headache. The drooping of the lids which we have seen to occur frequently in headache, may perhaps in some cases be partial paralysis of the levatores palpebrarum. On the other hand, the sphincter of the eye may be suddenly contracted as the result of pain, *e.g.* :

Headache in the hollow of the temples ; compels her to close her eyes.

Neuralgia of the right temple, "passes round the eye, closing it."

Another well-marked peculiarity is that the brows are often knit. This, with the drooping lids and the lustreless, sunken eyes, causes a distressed and weary expression, which constitutes the characteristic physiognomy of headache.⁴

¹ Several authors, ancient and modern, have remarked upon the modifications in the prominence of the eyes which may occur in connection with headache. Thus Aurelianus observes that during a severe paroxysm of headache "rubri atque prominentes oculi fiunt"; and Pelham Warren (*op. cit.*, 1813) alludes to a distension of the eyeballs accompanying headache. Wepfer describes a case of hemicrania in which there was great pain in the right eye, which was retracted and shed an abundance of tears. "De Affectibus Capitis," Scaph., 1727, p. 134.

² *Op. cit.*, p. 305.

³ Ziemssen's "Encyc.," vol. xiv., p. 12.

⁴ F. Warner, writing on "Recurrent Headache in Children," refers to the facial expression of the patients, many of whom, he says, have a look of depression and manifest a heaviness and fulness of eye, especially of the under lid (*British Med. Jour.*, Dec. 6, 1879, p. 890). Now this latter frequently results from some error of refraction, such as hypermetropia or astigmatism, which are potent sources of headache; and it is not, therefore, surprising to find fulness of the under lid common among children who are liable to headache.

CHAPTER III.

INFLUENCE OF HEADACHE UPON THE PERIPHERAL ORGANS OF HEARING, SMELL, AND TASTE.

HAVING in the last chapter considered the influence of headache on the eyes irrespective of the visual nervous system, I now purpose in a similar way to say a few words concerning its effect on the peripheral organs of hearing, smell, and taste, without any reference to the condition of the auditory, olfactory, and gustatory nervous systems. My remarks will necessarily be brief, for though these organs are affected in many different ways, the effects lie for the most part beyond the reach of observation. It is probable, for instance, that the ear is as profoundly influenced as the eye, but while we can examine the fundus, and note the size of the pupil, the degree of prominence of the globe, the lustre of the cornea, and so forth, in the case of the ear we can see no further than the drum membrane. Yet it is certain that if our means of investigation were more extensive we should notice manifold changes in it, such as modifications of the tension of the fluids within the labyrinth, in the secretion of the mucous glands of the middle ear, and in the action of the muscles which move the ossicles.

The Peripheral Organs of Hearing.—The ears, like the eyes, are often involved in the pain of headache.¹ I have never noticed any modifications in the secretions of the external meatus in connection with it, although it appears to me not improbable that observation directed to this particular would give a positive result. It not infrequently happens that headache supervenes upon the cessation of a wonted discharge from the mid-ear, but this cessation is rather the cause than the

¹ See Part II., chap. xi.

effect of the headache. Abnormal sensations, as for instance of numbness and weight, are often felt in the ears in connection with headache.

The Peripheral Organs of Smell.—Just as the eyes and ears may be involved in the pain of headache, so also may the nose. As a rule the root of the nose is affected, and on both sides. The pain may be continuous and fixed, or shooting:¹

Agony across the eyes and nose; has to hold the nose.

Pain across forehead, vertex, and bridge of nose.

Megrim. Pain across forehead and nose.

Frontal pain; also on either side of the nose (very marked).

Frontal pain and in upper third of nose (common).

Frontal pain; also on the bridge and sides of nose.

Pain shoots from the vertex across the forehead to either side of nose (the bridge not affected).

Pain shoots down the left side of the nose.

Paroxysms of pain lasting about ten minutes; pain shoots down right side of nose.

Other sensations may be felt in the nasal region:

Has feeling of weight at the bridge of the nose.

Has peculiar beating at the bridge of the nose.

Has a “knocking” in the nose.

Has soreness at the root of the nose after headache.

Has “bruised feeling” across the eyes and at the bridge of the nose.

I have little doubt that the nasal secretion may be affected, but though I have observed many abnormal states of the nasal mucous membrane and its secretion in sufferers from headache, in none was there evidence of the condition being the *result* of the headache.

Patients have told me that their headaches have been relieved by a profuse discharge from the nose, and Hippocrates has a remark to this effect. According to Tissot a paroxysm of megrim may terminate by epistaxis. I have seen epistaxis in non-megrinous headache, and with marked relief to the patient, but the bleeding in such cases can scarcely be regarded as the effect of the headache.

The Buccal Cavity.—The pains of headache may extend to

¹ G. E. Stahl remarks that pain in the head may extend to the root of the nose. (“Med. Dogmat. System,” Halæ, 1707, sect. 11, p. 663.)

the buccal cavity and pharynx, as well as to the whole of the face. Pains in the tongue and pharynx are by no means rare, and these parts may be the seat of many forms of dysæsthesia, such as numbness, tingling, and burning. The numbness which often ushers in an attack of megrim may affect the tongue. Similarly, a feeling of pressure may be felt within the mouth: thus, one patient complained of a sense of pressure against the roof of the mouth.

According to Haig, the secretions of the salivary glands, like the renal secretion, are apt to be diminished during the paroxysms of megrim.

CHAPTER IV.

NATURE OF THE PAIN IN HEADACHE.

THE pain in headache varies considerably in character, if we may judge from the different ways in which patients seek to describe it, but any attempt to classify the sensations the term "headache" is used to cover seems well-nigh hopeless. Obviously, our main difficulty arises from the facts that the sensations, though varied, often differ but slightly from one another; and secondly, that all do not attach the same meanings to the same terms. Under these circumstances I have judged it best to retain, as far as possible, the actual words, often graphic if not classic, used by my patients in their gropings after adequate expressions of their feelings, leaving it to the reader to decide for himself what, exactly, they were intended to convey. But keeping in mind this *indeterminateness*, as we may call it, of language, we are yet able to arrive at certain definite facts about the character of the pain, and even, on the strength of these, to make a rough kind of grouping of its main varieties.

The pain may be continuous and monotonous, as in ordinary "dull" headache; or it may increase with each pulsation of the blood, in which case it is frequently described as throbbing. Probably the terms splitting, hammering,¹ knocking, jumping, splashing, beating, often employed, refer to this pulsatile exacerbation. Not infrequently the exacerbations occur at longer intervals, varying from minutes to hours, when the pain may aptly be described as paroxysmal. The paroxysms may be

¹ Stahl writes of a case: "Es sehe nicht anders, als wann ihnen ein Hammer auf den Kopff schlüge" ("Med. Dog. System,," etc., Halae, 1707, sect. ii., p. 680).

very violent and but the intensification of an abiding state, or they may be separated by intervals of complete immunity. All the following terms were probably used to denote pain of the neuralgic kind:¹ shooting, darting, sharp, pricking, stabbing, like needles, cutting, like a knife, neuralgic, rheumatic, like something running into the head.

Although such acute pains are most common in the anæmic and debilitated, they are not rare in the plethoric, as my notes amply testify. They may also, of course, occur in organic disease of the brain and its coverings.

The following varieties may be grouped together: scraping, (scraping with a knife), sawing (like the sawing of bone), gnawing, tearing (as if some one were dragging the flesh off the bones), scratching, aching, like screws (as if the head were being screwed up tight), crushing.

When gnawing pain is complained of, it would appear to be felt most frequently at the occiput:

Like something gnawing and burning at occiput (nits).

Like "dogs gnawing" at the back of the head.

Gnawing pain at the occiput, "like a claw."

Pain all over the head, like something gnawing.

The following make another group:

Splitting.

As if head were "coming in two."

As if head were "being chopped open."

"As if some one were hammering, or knocking, head to pieces" (not uncommon).

As if "some one were knocking the brain."

As if the head were "falling to pieces."

As if "some one were knocking each side of the head."

Burning pain is not uncommon: burning and pricking, burning and smarting, burning and darting, burning pain, scalding pain.

Occasionally, the pain appears to be referred to the roots of the hair:

Like "some one pulling the hair upwards."

The roots of the hair are "like so many pins."

¹ Shooting pains are again considered at p. 262 *et seq.*

The following terms refer to the intensity rather than the quality of the pains: fearful, terrible, dreadful, violent, agonising, unbearable, killing.

Sometimes pain in the head is accompanied by flushing. This is especially the case when it comes on in sudden and violent paroxysms, the patient complaining of feeling hot and faint, and perhaps turning cold as the heat passes off. In these cases the skin may or may not act. Again, the pain may be accompanied by profuse sweating quite independently of flushing.

A tendency to flush signifies debility, as I have elsewhere shown, and it is not therefore surprising to find flushing and headache very often associated, especially in women. Indeed, it is rare for a patient suffering from flushing to be entirely free from headache.

When the pain is very sudden and severe, the patient may stagger under it: in rare cases he may actually fall down. Sudden giddiness may be the cause of this.

The pain of headache is usually gradual in its onset and subsidence, though it sometimes begins and ends quite suddenly.

An individual may suffer from more than one kind of pain in the head at the same time. Thus he may have a dull pain in the occiput and a shooting pain in the temples.

CHAPTER V.

CLAVUS. CLAVUS HYSTERICUS. GALEA. MONOPAGIA.

CLAVUS is a form of headache in which a very intense pain is experienced in a limited spot, the patient feeling as if a nail were being forcibly driven into the head.¹ The application of the term *clavus* to this variety has been attributed to Sydenham,² but while that physician may have been the first to add the epithet *hystericus*, it is certain that the name was so employed long before his time. It is, so far as I have been able to discover, first met with among the writings of Arabian physicians, who also were the first to employ the terms *monopagia*, *ovum*, and *galea*,³ using them apparently in the same sense as *cephalæa* was employed by the Greeks and Romans, namely, to denote a violent and protracted pain involving a large part of the head.⁴ In the *Rosa Anglica*⁵ we get the meanings of these and other terms set forth succinctly. Thus *soda* is said to denote headache in general; *dolor ovalis* or *cephalæa*, pain pervading the whole head; *emigranea* or *semicranealis*, that which pervades one side of the head;

¹ "Quam si clavus ferreus in caput vi adigeretur." (T. Sydenham, "Opera anima," p. 373, translated by G. A. Greenhill, Lond. 1844.)

² See "De Dolore Capitis," J. F. Stuckens, Brux. 1787; also "Traité de l'Hystérie," P. B. Briquet, 1859, p. 215.

³ See "Archipathologia," &c., P. E. Montalto, 1614.

⁴ Thus Avicenna, after pointing out that the pain may affect one or other side of the head, or the front or back part of it, adds, "Quandoque totum caput continet, et quæ ex ea est consuetudinaria inseperabilis, nominatur ovum, and [nux] cujus assimilatio est ovo [armorum] quod super totum caput comprehendit," (*op. cit.*, lib. iii. fen. i. tract. ii. cap. i); and in cap. xxxv. he uses "ovum" and "cephalæa" as synonymous. See also Sennerti, "Opera," Lug. 1650, tom. ii. p. 531.

⁵ "De Dolore Cap.," folio 69 b.

clavus, or *monopagia*, pain which is limited to a small area; and *dolor fortis galeatus*, pain encompassing the whole head like a helmet.¹ Gordonius,² who wrote in the beginning of the fourteenth century, refers to *clavus* in the following terms: "Where the pain is confined to one spot it is called 'clavus' and folks believe that they have been bewitched even; it seems to them that they are pricked with nails and needles."

Rossel, who has a dissertation entitled "*De Ovo Passione Galeata*," defines *ovum*, or *passio galeata*, as a special variety of cephalæa, thus named on account of the pain encompassing the head like a helmet or a shell.³ It seems not unlikely that the name was originally used to designate those comparatively common cases in which the patient experiences a sensation as of a tight cap or band applied to the head, but it is long since either it or *clavus* was employed in its original sense. Thus Stapleton and Briquet used them interchangeably,⁴ and Stuckens declares that *ovum* refers to pain on the crown occupying an area of the size of an egg—what kind of egg he does not specify!⁵

As *ovum* and *galca* are now obsolete terms, they need no further consideration. *Clavus* is, however, still used, and therefore demands some attention. Most writers employ it to denote an essentially hysterical pain, whence Sydenham's name for it, *clavus hystericus*;⁶ while others have associated it with

¹ These definitions seem to have been borrowed for the most part from Haly Abbas. Riverius speaks of a pain "a Gordonio elavus nominatur." Lazari Riverii, "Observationes," &c., Hagæ Comitum, 1656, p. 339.

² Bernh. Gordonius, "*Lilium Medicinæ*," 1305; quoted by Wright, "Headaches, their Causes and their Cure," Lond. 1877, p. 35 n.

³ "It is called *ovum* or *passio galeata* on account of its occupying a certain part of the head, namely, the bregma, after the fashion of a helmet or egg-shell. It is a variety of cephalæa."

⁴ Stapleton writes: "But if it (=the pain) remains chiefly localised in one spot it is known as 'elavus' or 'ovum' and it belongs to the hysterical-hypochondriacal order of ills." *Dissertatio Medica*, "*Quid Capitis Dolor?*" Lond. 1877. See also Briquet, "*Traité de l'Hystérie*," 1859, p. 215.

⁵ "Si vero in vertice capitis ad magnitudinem ovi circumscriptus hæreat *ovum*, et si sensum quasi perterebrantis clavi in vertice vel occipitio ponat *clavus* noneupetur."—*Op. cit.*

⁶ Other writers holding this view are Stapleton, Stuckens, Hoffmann (who defines *elavus* as "a pain confined to a small spot on the crown in hysterical women"), Wright, Briquet ("There is a form of headache which is

hypochondria.¹ It has also often been used to denote neuralgia, especially supra-orbital, approaching in character to megrim, or of the nature of brow-ague. Thus, according to Anstie, the pain in *clavus hystericus* corresponds to the supra-orbital or parietal points,² and may even be felt in both at the same time.³ It is, he says, related to megrim, and may, like it, last a long time, and induce vomiting. He objects to the epithet *hystericus* as applied here, observing that clavus is more frequently the immediate consequence of megrim than of hysteria.⁴ Fagge asserts⁵ that the name *clavus* was formerly applied to those cases of sick headache in which the pain is confined to a spot over the brow. Sir George Johnson⁶ also locates the pain of clavus over the brow, and states that in some cases it comes on at the same hour every day. Colin⁷ points out that it may, like megrim, cause nausea and vomiting. It would appear indeed that the *clavus hystericus* of Sydenham was, if not actually megrim, something very like it:—"Here the spirits of the body at large are concentrated upon a certain point of the pericranium, so limited, so boring, and so severe, as to feel as if an iron nail were being driven into the head. This is also attended by a notable vomiting of green matter."⁸

While recognising that any acute pain may produce vomiting, we must, I think, conclude that *clavus* was used often, though inaccurately, to denote attacks of megrim in which the pain was severe and localised, as well as malarial neuralgia.

only present among the hysterical—le clou ou l'œuf hystérique," *op. cit.*, p. 215), Ludolff has a dissertation *De clavo hysterico* (Erfordii, 1750. See Ploucquet, *op. cit.* p. 216), which, however, I have not read. Colin ("Essai sur la Céphalalgie," p. 37).

¹ Stapleton, Stuckens.

² According to Briquet, it is never multiple, *op. cit.* p. 215.

³ See also Pariset, "Dict. des Scien. Méd.," Paris, 1813, vol. iv., p. 418.

⁴ *Op. cit.* p. 29.

⁵ "Principles and Practice of Med.," Lond. 1891, vol. i., p. 777.

⁶ "Med. Lectures and Essays," Lond. 1887, p. 272.

⁷ "Dict. Ency. des Scien. Méd.," Paris, 1873, Art. Céphalalgie, p. 37.

⁸ Sydenham continues: "Now the concentration of the spirits from the different parts of the body is not unlike the collection of the sun's rays under a burning glass, and just as these latter from their united force have power to scorch, so do the former create pain by joining in the laceration and dissection of the membranes" ("The Works of Th. Sydenham," trans. by Latham, Lond. 1848, p. 373).

Setting aside such cases, however, since they manifestly have no relation to hysteria, we have to inquire how far those to which the term is more properly applicable are really hysterical. Briquet met with only two typical cases of clavus among a large number of what he terms "hysterical cephalalgia," nor have I seen any reason to connect the pain with hysteria. Pains localised in small areas of the head are comparatively common. They are frequently intense, but I do not find from my notes that they are often compared to that which would be produced by something sharp being driven into the head. When the pain is thus likened, it is often impossible to localise it within a narrow area. Thus of four such cases it was not localised in two :

Pain like something sharp running into head (not definitely localised).

Pain like sharp instrument pushing into her head (not localised).

Pain like sharp knife running into superior occiput.

Pain like a spear running through head (area localised).

In the vast majority of such cases the patients are suffering from profound anæmia and debility, and in this connection it is of interest to note that Sydenham himself observed that clavus hystericus is "pre-eminently common with the chlorotic," a statement which proves that the "hysteria" of his time was very different from that of to-day. Nothing could better show the lasting influence of a great authority than the frequency with which one reads, even to this day, of clavus as a manifestation of hysteria, and the rarity of its occurrence.¹ Anstie is another who alludes to the connection between clavus and anæmia:—In the days of phlebotomy it was "very common for a delicate girl, on complaint of some stitch of neuralgia or muscular pain in the side, to be immediately bled to a large extent, with the idea of curing an imaginary commencing pleurisy."² Pain was increased, more blood in consequence drawn, and clavus often resulted.

The situation of clavus varies. Stuckens and Stapleton place

¹ I may refer in passing to another common error—viz., that which regards globus as pathognomonic of hysteria. It may occur as a manifestation of dyspepsia, without the slightest symptom of hysteria.

² *Loc. cit.*

it on the vertex. Similarly, Colin describes *le clou* as a very sharp and circumscribed pain occupying a surface of from 1 to 5 centimetres on the vertex, generally in the neighbourhood of the sagittal suture.¹ According to Labarraque, it generally occurs in the occipital region. Anstie, Wright, Fagge, and Johnston locate it in the brow, and the former writer in the "parietal" spot also. Briquet, unlike Anstie, declares that the pain of clavus is never multiple, and that it occurs most frequently in the temporal region and sinciput. In my experience it is most common over the parietal bones, and in the supra-orbital region. It may also involve the temporal region.

¹ Some, he writes, compare the pain to that caused by burning coal, others to the sensation produced by a piece of ice, or by a sharp instrument like a file. According to him it may persist for days, weeks, and months. *Op. cit.*, p. 37. Briquet follows him in this description, *op. cit.*, p. 215.

CHAPTER VI.

THE SUPERFICIAL AREAS IN WHICH THE PAIN IS FELT.

HEADACHE rarely occupies the whole surface of the cranial vault, but is generally limited to some one part of it. Moreover, those who are liable to it by no means always suffer from it in the same place. Patients not infrequently complain that the pain is "one day in one part and another day in another," or it may remain for some time in one region, and subsequently attack another. Thus, in one patient the pain was for a while vertical, it then became frontal, and finally after some weeks was chiefly located in the eyes. In respect of their situation, head-pains may be classified thus: (1) those which are bilateral and symmetrical, the pains in these cases being sometimes equally intense on the two sides, and sometimes more intense on the one than the other; (2) those which are bilateral but asymmetrical; and (3) those which are strictly unilateral.

(1) The bilateral symmetrical headache, equally intense on both sides, would probably, on casual consideration, be set down as by far the most common variety, but it is doubtful whether it is; for, in the first place, a large number of symmetrical headaches turn out, on close examination, to be more severe on one side than the other, and secondly, purely unilateral headaches are much more common than is generally supposed.

Symmetrical headaches classify naturally into (*a*) frontal, (*b*) vertical, (*c*) occipital, (*d*) parietal.

(*a*) The pain in frontal headache may be either temporal or supra-, mid-, or infra-frontal, and it may involve, especially in the latter case, the nasal and orbital regions; not infrequently all these regions are involved together. Frontal headache

is very often more pronounced on one side than the other, being felt, for instance, more over one eye or in one temple than the other. Sometimes the pain is felt in a circumscribed part of the forehead just above the root of the nose, and not infrequently the nasal region is also involved. In these cases the patient is apt to complain of a beating sensation with the pain.

(b) In vertical headache the pain may be situated in the antero-, mid-, or post-vertical regions, most often in the two latter. The vertex corresponds to the situation of the occipito-frontal aponeurosis, the structure of which, it is highly probable, has something to do with the genesis of the pain and other morbid sensations, such as that of weight and of burning, so apt to be felt in this region. The vertical headache is more prone to be symmetrical and of equal intensity on two sides than headache involving other parts. Only very rarely is it confined to the one side, and still more rarely is it more intense on one than the other.

(c) Occipital headache may involve the supra- and infra-occipital and the mastoid regions. All these regions together, or any pair of them, may be affected on the two sides.

(d) The parietal regions are frequently affected symmetrically, but in these cases other parts are generally involved in the pain. I have myself no notes of cases in which the parietal regions have been symmetrically affected to the exclusion of others.

The following are instances of symmetrical headache in which the pain was felt more on one side than the other :

Pain in the forehead and eyes ; felt chiefly on the left side (many).

Pain in the infra-frontal region and eyes, felt chiefly on the right side (many).

Pain in both temples, chiefly the left side (many).

Pain in both temples, chiefly the right side (many).

Vertical pain ; chiefly on the left side.

Occipital pain, chiefly on the left side (many).

Occipital pain, chiefly on the right side (many).

Pain in the mastoid regions, chiefly the right side.

Pains all over the head, chiefly the right side.

(2) Bilateral asymmetrical headaches are very common. The following are instances :

Pain in the vertex and right parietal region.

Pain in the occipital, left parietal, and frontal regions.

Pain in the vertex and left supra-orbital region.

Pain chiefly concentrated in the frontal and left occipital regions.

(3) Unilateral headaches.—We find Aretæus writing thus: “Occasionally, the right side only or the left is attacked, involving one temple, an ear, or an eyebrow, or the eye as far as its centre (?), or one-half the nose, beyond which the pain does not extend, but remains confined to one-half of the head. This is termed heterocrania.”¹ It is headache of this kind that we have now to consider. Aretæus probably used the term *heterocrania* in the same sense as the Arabians used *clavus* and *monopagia*, namely, to denote a circumscribed pain. The Greeks were the first to apply the term *hemicrania* (from which is derived *migraine* or *megrim*) to these one-sided head-pains, while at the present time some writers use *hemicrania* interchangeably with *megrim*, a quite indefensible practice since, on the one hand, the pain may be confined to one side without being *megrim*, and, on the other, *megrim* very often involves both sides of the head.

It is certain that many of the older writers used *hemicrania* to denote asymmetrical pain, no matter how limited the area it occupied. Thus, Wepfer’s forty-seventh case is that of a boy affected with *hemicrania*, in which the pain occupied a space over the eye “which might be covered with a finger”; and his fiftieth case, also recorded as an instance of *hemicrania*, is that of a woman who suffered from pain in the upper jaw, temple, forehead, and nose, on the right side.²

A unilateral headache may involve the whole, or nearly the whole, of one side of the head. So, too, like ordinary face-ache and earache, the pain may spread so as to involve practically all one side of the head:

Anæmic; very bad teeth. Severe face-ache on the left side; the pain extends, more or less, over the whole of this side of the head.

Middle-ear disease on left side. The pains spread forwards to the face, and backwards to the occiput.

¹ “Of the Causes and Signs of Acute and Chronic Disease,” trans. by T. F. Reynolds, Lond. 1837, p. 59.

² “De Affect. Capitis,” Scaph. 1627, p. 126.

Pain involving the whole of the right side of the head.
Numbness and pain on the left side of the head.

Generally, however, in unilateral headache, the pain is more localised. The painful area may more or less exactly correspond to the distribution of a particular nerve, such as the supra-orbital, supra-trochlear, nasal, auriculo-temporal, great auricular, or great occipital¹ (I have never satisfactorily localised pain to the small occipital); or only a limited portion of such an area, or an area supplied by two or more nerves, may be involved. The latter is obviously the case when the pain results from some local lesion, as, for example, gumma or periostitis; but localised pains bearing no definite relation to nerve-distribution may occur independently of such lesion. This is proved by the fact that they may be of quite an evanescent character. And it may here be observed that the presence of tenderness in the region of the pain is no proof of its being due to local changes; for all pains in the head are apt to be accompanied by tenderness, and, on the other hand, tenderness amounting to actual soreness may be present without the slightest pain.

I proceed now to enumerate the areas in which localised unilateral pains are most frequently observed, and in so doing I shall leave the question of nerve-distribution entirely out of consideration, since the neuralgias of special nerves are subsequently referred to.²

(a) The supra-orbital region.—Pain localised to one supra-orbital region is comparatively common. It may be fixed, or shooting, or both. It is generally just above the eye and below the scalp, being often much more localised than the distribution of the supra-orbital, which shows pretty conclusively that it is not due to affection of the nerves. The elastic term *hemicrania* was anciently made to cover cases of it. They often used to assume an intermittent type, and were obviously due to malaria; and even to this day supra-orbital

¹ I have treated of neuralgias of these nerves in the second part of this chapter—*Parts involved in Shooting Pains*, etc., p. 262, and in pt. iii., chap. xiv.

² Elliotson gives, under the heads of "neuralgic" and "local" pains in the head, a fairly good account of pain involving small areas: *Lond. Med. Gaz.* Dec. 29, 1832.

pain, of whatever origin, is spoken of as "brow-ague," though genuine brow-ague is now seldom met with, at least in England. According to Anstie the supra-orbital region is a favourite site for clavus, and I have seen the pain here very acute.

Among my cases the most common cause was an error of refraction coupled with debility. The two sides were affected with equal frequency. Tenderness over the supra-orbital notch was made out occasionally. In those accustomed to supra-orbital pain I have often noticed asymmetry in the frontal wrinkles and the height of the eye-brows.

(b) The temporal region.—Pain confined to one temporal region is of fairly common occurrence, especially if megrinous. It may be dull and continuous, or sharp and piercing, or both. A tendency to it may be manifested for years, and the temporal artery on the affected side then often becomes more tortuous than its fellow. The frequency with which the right and left sides were affected was as 7 to 11.

(c) The mastoid region.—This region, though less liable to pain than the last two, is yet, for some reason or other, predisposed to it, the patients complaining of "pains behind the ear." In disease of the mastoid cells, pain over the mastoid process is of course often present, but it frequently occurs in this site without any organic disease. Other morbid sensations may be felt here. Thus one patient complained of a "numbness at the back of the left ear." The frequency with which the right and left sides were affected was as 2 to 5.

(d) The parietal region.—This is probably the region, *par excellence*, of clavus. Sometimes quite a small area over the upper part of the parietal bone is attacked with pain of a very violent character, but I have known it to involve, within more or less accurate limits, the whole of the right parietal region. The left side was affected twice as often as the right.

(e) The occipital region.—Pain is very rarely confined to one occipital region. Even in genuine occipital neuralgia both sides are generally involved, though one may be more severely affected than the other.

(f) The nasal region.—Sometimes the pain shoots down one side of the nose.

It will be observed from the foregoing that the left side of

the head is more liable to pain than the right. This fact has long been known. Thus, in 1758, Fordyce wrote of hemicrania:—"Sinistram capitis partem dextrâ sæpius vexari observârunt nonnulli;"¹ and Heberden has the following observation on the same disorder:—"It has happened that I have oftener heard of this on the left side than on the right; but I believe this to have been merely accidental."² Vaughan also remarks upon the greater frequency of sinister pain, commenting, by the way, that it cannot be explained on the ground that the right half of the body is more vigorous, as some had believed, than the left.³

I have looked through the fourteen cases of hemicrania recorded by Wepfer, but these, if anything, show a preponderance of pain on the dexter side.⁴

Murphy, describing "neuralgic headache" occurring in women and often involving the tract of the sub-occipital nerve, writes: "It is singular how much this disease is confined to the left side of the head; we find such to be the fact in ninety-nine cases out of a hundred;" and even when both sides are involved, the left is, he contends, the one chiefly affected.⁵ Of sixty-four cases of functional earache recorded in the *Arch. für Ohrenheilkunde*,⁶ twenty-one occurred on the right side, forty on the left, and three on both sides. Again, it is recorded by Legal that of a number of cases of earache and headache, in four-fifths the pain was on the left side.⁷

Grouping together all my own cases of unilateral headache I find that the proportion of dexter to sinister cases is about

¹ "Historia Febris Mil. et de Hemicrania Dissertatio," Lond. 1758, p. 80.

² "Commentaries," &c., W. Heberden, 3rd edit., Lond. 1806, p. 93.

³ "An Essay on Headachs," Lond. 1825, p. 44.

⁴ See "De Affect. Capitis," Scaph. 1600. Cases 47-60.

⁵ I cite this observation simply because it bears upon the relative frequency with which the two sides of the head are involved in pain. Of occipital pain occurring practically always on the left side I know nothing.

Montalto states that bilious headache "dextro item lateri magis est familiaris," while the melancholic headache "sinistro item lateri magis est familiaris," *Archipathologia*, 1614, pp. 69, 70. This conclusion was evidently the result of a *a priori* reasoning, the liver which secretes yellow bile being situated on the right side of the body, while the spleen, which was supposed to secrete the black bile, is situated on the left.

⁶ Vol. xxvi., p. 157.

⁷ *Deut. Arch. f. Klin. Med.*, Band xl., S. 208.

as 2 : 3, while in those bilateral cases in which the pain was more pronounced on the one side than on the other, the left side similarly preponderates. A reason for this I am unable to find, but a similar tendency is observed in the case of the thorax and abdomen. Left infra-mammary pain is far more common than the right, just as is left ovarian pain.

Parts involved in Shooting Pains in the Head and the Direction which the Pain takes.—Sometimes pain in the head shoots, as in an ordinary neuralgia, and it is then occasionally possible to refer it to a particular nerve, such as the great or small occipital, the great auricular, infra-orbital, the supra- or infra-trochlear, the auriculo-temporal or nasal, the direction it takes being, again as in neuralgias, towards the periphery of the nerve. Often, however, neuralgic pain in the head does not, as far as can be ascertained, follow the course of any particular nerve, as, for instance, when it shoots *through* the head; and in these cases it must originate, not in a lesion of the nerve-trunk, but rather in the grey matter from which the sensory nerves take their origin.

Neuralgias in the posterior aspect of the head—those, viz., involving the occipital and great auricular nerves—are considered under “Cervico-occipital pains.” Here we will consider those implicating its anterior aspect. They constitute neuralgias of the fifth nerve, which supplies the whole of the head anterior to a vertical section drawn through each external auditory meatus. I have notes of a large number of these cases, but I shall here discuss those only which involve parts situated above the base of the skull, including with these the nasal region. The nerves supplying these parts are—(1) the first division of the fifth, which gives off the frontal (from which the supra-orbital and supra-trochlear are derived), the lachrymal, and the nasal, the latter being the chief sensory nerves of the eyeball and its muscles, and from which the infra-trochlear springs; (2) a branch from the second division of the fifth, which is given off from the nerve which is the infra-orbital canal, and which helps to supply the temporomalar region; (3) the auriculo-temporal branch of the inferior division of the fifth.

It has been impossible to group the following instances of

shooting pains involving the front of the head on a strictly anatomical basis, seeing that areas supplied by two or more nerves are often implicated. Pain involving the fore part of the head and shooting along the surface backwards, or forwards, or both, may start in the forehead, eyes, or temples, and spread backwards. Such cases may be either unilateral or bilateral :

(a) Unilateral :

Pain shoots from the right eye to the top of the head.

Instances of this are common ; there can be little doubt that they are due to involvement of the supra-orbital nerve, but in the following instances it is obviously impossible to refer the pain to any one nerve :

Pain shoots from the right temple to the back of the right ear.

Pain shoots from the left temple to the occiput.

Pain shoots from the left side of the forehead to the back of the left ear.

(b) Bilateral.—When bilateral the pain is often more pronounced in one side than the other. As will be observed, several nerve-regions are frequently implicated :

Pain shoots from both eyes to the vertex (fairly common).

Pain shoots from the forehead to the vertex.

Pain shoots from the forehead to the upper occiput, chiefly on the right side.

Pain shoots from the temples to the vertex.

Pain shoots from the lower forehead to the back of the ears.

Or the pain may start in any part of the head and travel towards the forehead or temples. Cervico-occipital pains frequently progress in this way, as pointed out elsewhere. Thus :

(a) Unilateral :

Pain shoots from the right anterior parietal region to the right temple.

(b) Bilateral :

Sudden "splashing" pain passes from the posterior vertex to the forehead. Shooting pain from the mid-vertex to the eyes and apparently confined to the region supplied by the supra-orbital nerves.

Shooting pain from mid-vertex to the forehead, eyes, and either side of the nose.

The pains do not, however, always pass in the one direction as in the cases quoted. They may shoot both backwards and forwards :

Pain shoots from the occiput to the forehead and eyes, and also in the reverse direction.

Pain shoots backwards and forwards between the forehead and the posterior vertex.

I have met with several instances of neuralgic pain involving the terminal portion of the nasal nerve. The direction of the shooting is always downwards, and it may involve one or both sides of the nose :

Pain shoots from the vertex to either side of the nose (the bridge not affected).

Pain shoots down the left side of the nose.

Has paroxysms of violent pain shooting down the left side of the nose and coming on about every ten minutes.

Pains on the inner side of the eye and adjacent aspect of the nose, either fixed or shooting, are not uncommon. They are due to involvement of the supra- and infra-trochlear and nasal nerves. I have, I believe, definitely traced pain to the supra-trochlear nerve, but never satisfactorily to the infra-trochlear nerve alone.

In regard to the existence of the *points douloureux* in neuralgias of the anterior part of the head, a tender point may sometimes be detected over the supra-orbital notch in supra-orbital neuralgia, and I have in one instance detected a similar point near the infra-trochlear nerve.

(2) Just as pains may spread sagittally either backwards or forwards along the surface of the head, so also may they spread up and down the sides of the head. These cases are, however, uncommon. In some of them the pain may be more or less definitely referred to one nerve, as in a case described under cervico-occipital pains, in which it "started in the right side of the neck and flashed up behind the right ear to the right parietal bone," following the tract of the great auricular nerve. In another instance it followed the tract of the auriculo-temporal :

Pain shoots upwards from the left side of the neck in front of the left ear to the anterior part of the parietal bone.

Generally, however, the pain is not limited to any one nerve-area, but shoots forwards. It is often caused by ear-disease :

Otitis media of the left side, causing pain in the whole of the left side of the head. The pain shoots upwards to the vertex.

Pain in the head passing from the sides upwards.

Pain shoots from a spot above the right ear to the vertex.

Pain shoots from a spot above the right ear downwards to the right side of the neck.

Superficial neuralgic pains involving the sides of the head very seldom cross right over, though I have met with a few cases in which the pain was said to travel transversely.

(3) Hitherto we have considered those cases only in which the pain has spread along the surface of the head. It may also shoot *through* the head. This most commonly happens in the temporal region. It may start in either temple, passing to the opposite side, always in the same direction, or it may shoot backwards and forwards in both directions. I have notes of pains passing transversely through the back of the head, but none of pains passing through the head sagittally, though I do not doubt that such occur.

CHAPTER VII.

VISIBLE SIGNS OF HEADACHE.

HEADACHE generally gives some evidence of its presence in the facial expression. The most characteristic signs are a vertical wrinkling of the forehead just above the nose, due to contraction of the corrugatores supercilii, and a transverse wrinkling of the forehead, due to contraction of the occipito-frontalis. This brow-wrinkling is probably most apt to occur when the pain attacks the fore part of the head, and especially if the eyes are painful, or if photophobia is present. With the contraction of the corrugatores there is often a partial closing of the eyes by means of the sphincters, and a drooping of the lids from relaxation of the levatores palpebrarum, the primary object of either movement probably being to protect the eyes from light. I have noticed asymmetrical action of the frontal muscles in cases of supra-orbital neuralgia.

The temporals may be prominent. Often one is more so than the other, especially when there is a tendency to unilateral headache.

The colour of the face varies. In the headache which occurs in the early stage of fever, the cheeks are flushed and full from vascular turgescence, and the same may occur in that variety of megrim in which there is "a determination of blood to the head." In both these cases the pulsations of the carotids may be unusually visible. In non-febrile headache, however, the face is, in my experience, most commonly shrunken and pale, the supply of blood to it—whatever it may be to the rest of the head—being diminished. The complexion is apt to be sallow—dirty white, greenish, or yellow.

This tendency for the face to alter during headache varies

in different individuals. There are some who often look quite well when feeling very ill, while there are others in whom the face is a faithful reflex of the slightest ill-health. One of the latter class may in the morning be complimented because he is looking so well and in the afternoon receive the sympathetic condolences of his friends. The readiness with which the face expresses ill-health depends, I believe, upon two circumstances—first, upon the quantity of subcutaneous tissue, and secondly, upon the readiness with which its supply of blood tends to be modified. If it is abundant, and if the quantity of fluids circulating in it is ample and constant under passing modifications in health, the individual may look quite well when he is far otherwise. If, on the other hand, the face is inclined to be thin, and the bloodvessels supplying it liable to contraction from the slightest cause—simple fatigue, for instance—the individual may often look worse than he really is. If such a one has a headache, or even if merely fatigued, the fluids circulating in the circum-orbital tissue and in the cheeks are diminished, the eyes sink, the lids are wrinkled, and the face becomes pinched and drawn.

The eyeballs are apt to sink and the eyes to lose their lustre during headache; it is probably rare, in the absence of fever, for the iris to retain its normal brilliance. In fever, however, especially at the beginning and when high, the eyes may be unusually bright and prominent. Sometimes the conjunctiva is suffused in headache, and this is often the case in fever.

If the pain is severe, the entire facial expression may become indicative of suffering. The patient may put one or both hands to the head, either pressing or rubbing it; or grasping it in both, he may lower it between his knees, or restlessly pace the room. If in bed, he may roll it from side to side. In extreme paroxysms of pain the patient may cry out: such paroxysms are common in organic disease, as, for instance, in tumour of the brain and tubercular meningitis.

Severe pain in the head may lead to an increase of perspiration; thus, one patient complained that she walked about the room bathed in perspiration. It may also cause the patient to fall down.

CHAPTER VIII.

STRUCTURAL CHANGES IN EXTRA-CRANIAL TISSUES CONSEQUENT ON HEADACHE.

WE have seen that abnormal states of the extra-cranial structures may help to cause headache, though sometimes these states seem to be rather the consequence than the cause. Thus the scalp may be red and humid during headache, localised swellings may form, there may be an excessive formation of scurf, or finally, changes in the hair, such as greyness and alopecia, may occur.

Of the nature of the swellings in question I can form no opinion. The following are instances :

Localised swelling in the posterior vertex ; when tapped, a grinding pain is felt in the temples.

Lumps are apt to form where the pain is felt.

When the pain is severe, a swelling forms in the middle of the forehead, which sometimes has a bruised appearance.

Occasionally "bumps like small nuts" form in the painful area.

"Lumps as large as the tips of the fingers" form in the head when it aches, disappearing as soon as the pain is gone.

Excessive formation of scurf occurring in association with headache may be general or localised. The skin of the forehead may be affected in a similar manner. Thus one patient had, for years, noticed a scaling of the forehead after the headache.

Premature greyness is common among sufferers from megrim. It is almost always, I believe, indicative of the neurotic diathesis. I have observed it in those with a family history of insanity, and in those who have developed locomotor ataxy. Even the greyness which comes on more or less suddenly after

violent emotion has, I think, the same significance. I will go further and say that any suddenly occurring greyness denotes some nervous defect. Premature greyness differs from that variety which we may term the physiological, in that the one shows a tendency to be more or less general from the beginning, while the other usually begins in and spreads from one spot, generally the temple, which indeed receives its name from this circumstance, since greyness here marks the progress of time.

Asymmetrical greyness invariably results from some local nervous defect, and is frequently observed in neuralgic areas. Sometimes the greyness met with among the sufferers from megrim is more marked on the side in which the pain is usually felt than on the other.

Alopecia is frequently observed in connection with headache. The baldness which occurs in the part of the head covered by the headgear has no farther significance than the possession of a scalp peculiarly susceptible to the effects of pressure, but when the hair comes out from all parts of the head alike, the condition is pathological. It occurs in syphilis, after scarlet fever, and in other states betokening general debility. Many of my patients suffering from severe headache, have complained of this, a circumstance not to be wondered at, seeing that general debility is a potent cause of headaches. Localised patches of alopecia are not infrequently observed in association with severe local pain. In one of my patients suffering from intense headache and presenting a family history of insanity, the entire eyebrows came out but grew afresh on his recovery.

One word as to *xanthelasma*. According to Hutchinson, this disorder occurs essentially in the sufferer from megrim, and I have observed the association myself.

CHAPTER IX.

TENDERNESS OF THE SCALP AND ADJACENT REGIONS.

TENDERNESS of the parts covering the cranial vault is very common. Before proceeding to describe this symptom as it has manifested itself among my own patients, I may briefly refer to three varieties of scalp-tenderness which have been recognised; namely, (1) that which is sometimes present in intra-cranial disease; (2) that which accompanies gross organic (*e.g.* specific) affections of the cranium and overlying parts; and (3) the tenderness met with in so-called rheumatic headache.

(1) *In intra-cranial disease* Ferrier¹ has noticed many cases in which pain, otherwise absent, has been elicited by percussion over what appeared to be the site of the lesion; and Alex. Robertson² mentions a case of Jacksonian epilepsy in which it was similarly excited in the same area. He thinks that the force transmitted, by tapping the skull, to the underlying membranes may cause pain in them if they are in a morbid state. Obernier,³ too, observes that in tumour of the brain a limited spot may sometimes be discovered on the surface of the head very sensitive to pressure and percussion, and also during coughing and laughing. Again, Byrom Bramwell, in his work on "Intra-cranial Tumours,"⁴ alludes to the facts that in some cases the tenderness may be restricted to very narrow limits, and may be elicited not only by percussion but even by gentle pressure. Such localised tenderness may help us to localise the tumour if we are sure we are dealing with intra-cranial disease; we shall, however, see that tenderness over the

¹ *Brain*, Jan. 1879.

² *Lancet*, 1879, vol. ii., p. 869.

³ Ziemssen's "Encyc.," 1877, vol. xii., p. 252. ⁴ Edin., 1888, p. 26.

affected area often attends localised pain in simple functional headaches.

(2) When there is *organic disease of the cranium and overlying parts*—e.g., specific *osteitis* or *periostitis*—there is, it is needless to say, tenderness over the affected region.

(3) *Rheumatic headache* has been described by a number of writers, among others by Wright, Remberg, Symes Thompson, Ross, A. A. Smith, Handfield Jones, Hamilton, and Lauder Brunton, all of whom mention tenderness of the scalp as a prominent feature of it. This variety is somewhat difficult to identify, but probably the majority of writers who have described it intend to indicate the pain and tenderness of the scalp which result from sitting in a draught, and which may be compared to a “stiff neck” similarly induced. Tenderness, and even excessive tenderness, is, however, by no means confined to the rheumatic headache; it is a common accompaniment of all forms, and is often present quite independently of any.¹

I now proceed to describe the symptom as I have met with it in five hundred cases of ordinary headache and other abnormal cephalic sensations. In an investigation of this kind certain precautions are necessary; when the soreness is pronounced, the patient will at once acknowledge its presence upon inquiry, complaining, for example, that the use of the comb and brush causes pain; but the phenomenon may escape notice, or be forgotten—(I have myself, when suffering from headache, observed slight tenderness of the scalp, which I should probably not have noticed—at any rate, not have remembered—if I had not been interested in the symptom)—and we must not, therefore, be satisfied offhand with a negative reply; we must examine for ourselves, and even then we have no means of ascertaining the past existence of the symptom if it has escaped the memory. Another source of fallacy lies in the

¹ It is curious how tenderness of the scalp—a symptom perhaps as common as dyspepsia—has been overlooked by writers. When we have mentioned Pelham Warren (*Med. Trans. of Roy. Coll. of Physicians, Lond.* 1813, p. 233), who gives soreness of the scalp as a symptom of congestion of the brain, L. Jones (*Pract.*, vol. xlii., p. 345), who in his interesting paper on the relation between blood-pressure and headache alludes to its presence among a large number of his patients, and one or two others quoted in the course of this chapter, we have about exhausted the number of those who have referred to it.

wrong employment of words by the patient. Thus, I have known soreness of the head complained of when examination has shown it to be conspicuous by its absence, the term being, in fact, used to denote the ache. (I believe, however, that this use of the word is confined to patients of Scotch extraction).

The degree of tenderness varies from scarcely perceptible sensitiveness to soreness so exquisite that the slightest contact gives pain. The most usual complaint is that the scalp is "tender to the comb," or that "the brush cannot be borne." The following are examples of more pronounced tenderness. The patients complained of feeling:

As if the head had been bruised (several).

As if the head had been thumped (two cases).

As if the head had been beaten with a stick.

As if the head had been hit.

As if the head had been knocked.

As if the head had had a blow.

As if the hair had been pulled out.

As if the scalp were sore like a wound.

The Hair and Tenderness.—The hair stands in definite relation to tenderness of the head—a conclusion at once suggested by the fact that the hairy scalp is the part of the head more frequently tender than any other. There are few cutaneous regions so vascular as the scalp, and this vascularity, as we shall presently see, probably predisposes to the condition. The hair itself also, by dragging on the scalp, plays some part in causing it, especially if it is very long; one patient with tender scalp, for instance, "could not bear the weight of her hair." In like manner, the habit of dragging the hair up tightly in different directions, according to passing fashions, may induce tenderness. Hence two reasons at least why women are more liable to this symptom than men.

The influence of the hair in causing scalp-tenderness is well shown by the rooted objection which many quite healthy girls display to having the hair combed and brushed; if it is much tangled, the operation is a veritable torture. When the head is very tender, the slightest traction causes pain. Thus, one patient complained that when she combed her hair "she felt as if her whole head were being pulled off." In such cases the hair is apt to be neglected, and among the poorer classes

this often leads to pediculi—themselves a very potent cause of tenderness.

Women with tender scalps frequently complain that their hairpins hurt them. Thus :

Cannot bear to move her hairpins, head so tender (several).

Head sometimes so tender that she has to take hairpins out.

Has to let hair down, can't bear the hairpins.

Can scarcely keep hairpins in hair when she lays her head on the pillow (two cases).

Cannot bear hairpins to be put tightly in hair (two cases).

Sometimes the patient localises the pain in the hair-follicles :

There is soreness at the root of the hair.

If the hair is even touched, the roots "seem like so many pins."¹

Tenderness (pathological) of the Head occurring independently of Headache.—Many people, women especially, have habitually tender heads, the tenderness being a feature of that very common condition best designated by the term "nervousness" :

For years has had tenderness of the scalp.

Always had a rather tender scalp.

This kind of tenderness often becomes very pronounced at the climacteric ; indeed, I do not think that many women of civilised communities, however exempt before, pass through this epoch without experiencing it. It may, however, occur at other times, especially in connection with menstrual irregularities.

When occurring independently of pain it may affect the whole scalp, being generally the most pronounced on, if not confined to, the crown, and it is frequently associated with some abnormal sensation there—as, *e.g.*, of pressure, burning, irritation :

Æt. 19. Chlorotic. Has tenderness all over the scalp at times, independently of headache.

¹ I find that this condition has been described by Pincus as "hair ache," a "pain that upon the slightest touch of comb or brush seems to be instantly engendered at the root of each particular hair," Malcolm Morris ("The Book of Health," Lond. 1883, p. 906).

² Tenderness of the scalp is mentioned by Beard as one of the symptoms of neurasthenia.

The statement that headache may occur independently of tenderness will be readily accepted; indeed, the general opinion seems to be that tenderness is an unusual accompaniment of headache—a view which is, as I am endeavouring to show, erroneous.

It is, however, sometimes absent in those cases in which we should more especially expect it—viz., the neuralgic cases :¹

Sharp pain, no tenderness.

Shooting pain, no tenderness.

Neuralgic pain, no tenderness.

Pain over the left eye, no tenderness.

Tenderness and Pain occurring in Combination.—The connection between tenderness and pain is shown by those very common cases in which the two are localised, and occupy precisely the same region. Thus, the remark, “tenderness over the affected part,” occurs frequently in my notes. As instances let us take (a) symmetrical, and (b) asymmetrical aches :

(a) Symmetrical headaches.—Vertical, occipital, and frontal headaches may each be accompanied by tenderness in the painful areas, the order given representing the relative frequency of the combination. Thus, according to my notes, while two out of every three vertical headaches are accompanied by vertical tenderness, and occipital ache fairly often by occipital, frontal headache is only exceptionally attended by tenderness in the frontal region.

(b) Asymmetrical headaches still better show the connection between tenderness and pain. Cases in which the two sensations are confined to limited areas, as one-half of the head or a small, well-defined region only, are common :

Pain and considerable soreness over the right side of the head and neck.

Pain chiefly confined to a limited patch in the anterior region of the right parietal bone, then shooting downwards and to the left; affected part tender.

¹ J. Hutchinson, *Brit. Med. Jour.*, 1886, vol. ii., p. 61, has published a case of sharp, neuralgic, gouty pain in left parietal region, in which it is expressly stated that tenderness was absent.

Localised patch of pain ; the corresponding surface burning and tender.

Pain and tenderness over the right eye.

Again, those fairly common cases in which the pain involves the occiput and posterior neck admirably demonstrate the connection between the two :

Pain in the back of the occiput and neck ; affected region tender.

Pain in the back of the occiput and neck ; stiffness and tenderness in the same area.

I may here mention the tenderness which occurs in connection with megrim. Thus, Galen observes of hemicrania : "Some are in such severe pain that they can scarcely bear contact with the hand, . . . in which case it is quite clear that the pericranium and overlying skin are affected" ; Liveing alludes to the vascular fulness, ecchymosis, swelling of the scalp, and tenderness following the seizure ;¹ Möllendorff speaks of the tenderness of the affected part, and of the relief afforded by tight bandaging, a fact he urges in support of his vaso-motor theory ;² while Eulenberg states that in megrim there is often tenderness to slight pressure, though deep pressure relieves.³ According to Sir Dyce Duckworth, the scalp is apt to be so hot and tender in uric-acid headache that pulling a single hair is excessively painful.⁴

Relation in Point of Time of the Tenderness to the Pain.—

(a) The tenderness may precede the pain ; (b) it may occur with the pain ; (c) it may not occur, or not be noticed, till after the pain.

(a) Cases in which the tenderness precedes the pain are not, according to my notes, very common. The following are examples :

Sometimes before the pain comes on, notices soreness all over the head. The pain is not equally widespread.

The day before the pain comes on, the head is so tender that it will scarcely bear the comb.

(b) Cases coming under (b) are very frequent, the patient wincing when the painful part is touched :

¹ "Megrim" etc., p. 318.

² Quoted by Liveing, *op. cit.*, p. 309.

³ Ziemssen's "Encyc.," vol. xiv., p. 11.

⁴ "A Treatise on Gout," Lond. 1889, p. 225.

When the head aches much, cannot bear the comb ; only notices tenderness when the pain is bad.

The patient is often so occupied with the pain as to take little or no account of the tenderness which accompanies it.

(*c*) Cases under (*c*) are also very common.¹ Doubtless in many of these tenderness is present during the pain, but is not perceived until this has subsided, in evidence of which note that the patient often complains of the tenderness *being worst* after the pain. It should also be noticed that those anatomical changes which occur in the area of pain, and which, as we shall see, are probably the cause of the tenderness, do not take place at once but need time. Hence, the longer the pain lasts, the more likely is tenderness to occur, a fact pointed out by Anstie, and well shown in a case of megrim I observed, in which there was no tenderness unless the headache was of long duration.

I now cite cases in which tenderness was felt most or only after the pain :

Pain gone, much soreness remains.

The pain leaves tenderness.

Tenderness after the pain has abated a little.

After the pain the head feels as if it had been "beaten with a stick."

After the pain the head feels as if it had been knocked.

After the pain the head feels bruised.

When headache and tenderness of the scalp occur simultaneously, there need be no exact correspondence between the tender and the painful areas. Cases illustrative of this are common :

Pain all over the head, tender in posterior vertex.

Widespread pain, tender in occipital region.

Vertical pain, tenderness on vertex and right parietal bone.

Sometimes, indeed, the tenderness and the pain occupy quite distinct regions :

Frontal ache, vertical tenderness (common).

Frontal ache, occipital tenderness (not uncommon).

Occipital ache, vertical tenderness.

¹ Heberden says of headache : "The intensity of the pain will sometimes leave a soreness of the head for a day." "Commentaries," 3rd edit., Lond. p. 95.

Nor need there be any correspondence between the severity of the pain and of the tenderness :

Has severe pain, very slight tenderness.

Has marked tenderness, very little pain.

Parts of the Head most Liable to Tenderness.—All parts of the integument covering the cranium are not equally liable to tenderness. The hairy scalp is more prone to it than the frontal and temporal regions, and of the various parts of the scalp, the vertical portion, especially perhaps in its posterior aspect, is more apt to be affected by it than any other. Next to the crown the occipital region is the most common seat of tenderness.

Origin of Tenderness.—As regards the origin of the tenderness which is said to mark the site of intra-cranial disease, I am not inclined to accept the explanation of A. Robertson that the force of percussion, transmitted to the underlying parts which are diseased, sets up pain in them. On this explanation it is not the scalp or cranium which is tender, but some intra-cranial structure. I should be more disposed to regard the superficial tissues as actually tender in these cases, and to account for this condition on the principle enunciated by Hilton, according to which the parts of the body-wall overlying an internal organ are in intimate nervous connection with that organ, in which case the tenderness in question is similar in its origin to that which so frequently affects the abdominal wall in intra-abdominal disease—dyspepsia, for instance. The tenderness which accompanies organic disease of the cranium or scalp needs no explanation. Nor is there any difficulty in accounting for that which occurs in connection with ordinary functional headache. It is probably due to some actual anatomical change in the tender part, by which the algic end-organs are rendered hypersensitive. Wherever protracted pain occurs in a part, tenderness is apt to ensue therein. Thus, Anstie writes that for some time after a neuralgic attack, “the parts through which the painful nerves ramify remain sore, and tender to the touch ;” while in old-standing cases, “persistent tenderness and other signs of local mischief are apt to be developed in the

tissues around the local twigs.”¹ The following observations of Sir Benjamin Brodie are also of interest in this connection: “Nerves which have been kept for some time in a state of irritation transmit every impression which is made on them to the brain with a disagreeable or painful sensation superadded to it; in other words, the part afterwards will be tender to the touch. And more than this: the tenderness will be followed by increased vascularity; by a slight degree of swelling In a gentleman who suffered for a length of time from what was regarded as a most severe *tic douloureux* in the face, at first the parts to which the pain was referred retained their natural appearance, but ultimately they became swollen, from an effusion of serum into the cellular texture, and so exquisitely tender that they could not bear the slightest touch.”²

Liveing mentions vascular fulness, ecchymosis, and swelling as results of megrim. The fact is that the grey matter involved in the production of the pain is not only afferently, but also efferently, connected with the painful area, so that it is probably impossible for such grey matter to enter into the algenic state without dynamic changes occurring in the painful periphery. Dilatation of the blood-vessels is one of the most noteworthy results; exudation also takes place, and after a time thickening and other changes may occur.

Some such local changes as these probably generally occur when there is tenderness in the scalp as a result of pain, but I cannot say that I have ever satisfied myself that I have observed them, though occasionally I have thought the scalp somewhat swollen. Dr. Lauder Brunton's observations tend to show that the structural change accompanying local tenderness need not be very marked. “I have noticed,” he writes, “that the scalp, over the place where the pain is felt in headache depending on a decayed tooth, becomes tender on pressure while the pain lasts. This tenderness, however, is very transitory, and I have sometimes felt the headache and accompanying tenderness disappear from one part of the head and appear in another with great rapidity.”³ It seems not improbable, there-

¹ “Neuralgia and the Diseases that resemble it,” Lond. 1871, p. 7.

² “Lectures on Local Nervous Affections,” p. 17, quoted by Liveing, *op. cit.*, p. 318.

³ “Disorders of Digestion,” Lond. 1886, p. 101.

fore, that it is occasionally independent of local change in the extra-cranial structures, being possibly due to excessive irritability of grey matter.

Finally, as regards those very common cases of scalp-tenderness which occur independently of pain, it is, I think, highly probable that they also are due to some local anatomical change by which the algic end-organs are involved. The structure of the scalp, especially certain parts of it, renders it peculiarly liable to become tender from local (exudative?) change. It is a remarkable fact that the vertex is the commonest seat of this tenderness, and that this region is destitute of muscles (save, of course, the *arretores pili*), being covered by the dense aponeurosis of the occipito-frontalis. This membrane consists of closely interlacing white fibres; it is densest in its central parts, becoming thinner and looser laterally, where it blends with the fascia covering the temporal muscles. It is pierced throughout by numerous holes, through which the vessels and nerves pass from without inwards. In the central parts, where the membrane is densest, these apertures consist of tiny slits; but at the confines, where it is thinner and looser, they become larger and rounder. The margins of the holes are well defined, and reminded Prescott Hewett of the external abdominal ring, strong pillars, as he observed, forming their sides, with an intercolumnar membrane running across. Now, it is well known that after neuralgic pain the so-called *points douloureux* of Valleix are apt to appear, and that these points often correspond to localities where a nerve pierces an aponeurosis. Such localities, then, being prone to tenderness when there has been pain, can we wonder that tenderness on the crown should frequently result from pain in this region, and that it should be more pronounced on the extreme top of the head, where the membrane is densest and its apertures smallest, than at the lateral confines, where it is thinner and looser in texture, and where the apertures are considerably larger—where, in fact, the nerves are less apt to be compressed?

What, in these cases, is the cause of the local anatomical change we may assume to occur? We have seen that there are good grounds for believing that the hair predisposes to tenderness. Any undue traction on it causes an increase in

the vascularity of the hair-follicles, and is, we may assume, capable of causing exudation. The scalp, moreover, is very susceptible to those vaso-motor changes which occur in connection with flushes of heat; and when we couple with these two facts its extreme vascularity—no part of the body-surface, with the exception of the finger-tips, being more vascular—we can readily believe that undue exudation is prone to occur therein, and to an extent which, though insufficient to cause tenderness in other parts of the body, is, in the scalp, and notably in the region of the great epicranial aponeurosis, capable, for reasons given, of inducing it most distinctly.

I may here remark that those who are bald are less liable to suffer from a tender vertex than those who are not.

CHAPTER X.

SENSATIONS OF CEPHALIC PRESSURE AND HEAVINESS.

AMONG the many abnormal cephalic sensations, the following constitute an important group :

- (a) Sensations of pressure upon the head.
- (b) Sensations in which the head seems heavy.
- (c) Sensations of a vaguer character, though probably related to the other two, the patient often complaining of a heaviness in the head.

To this group the terms *carebaria*, *pesanteur de tête*, *Kopfdruck*, have been applied.

(a) Cases in which the head seems pressed upon are common. The sensation is generally referred to the crown, a fact pointed out two centuries ago by Langius, and often commented on by his contemporaries and immediate successors. Sometimes it is so marked that the patient almost fancies some heavy substance is actually resting upon the head ; he feels as if “ a ton weight ” or “ a hot plate ” were resting on the crown. The forehead likewise may be the seat of the pressure sensation ; also the occiput, but much less frequently. In the former case the bridge of the nose and the eyes, and in the latter the back of the neck, may be involved in it. Sometimes the pressure is felt on both sides of the head, or it may extend entirely round it, the patient feeling “ as if a cord or string were tied round the head,” or “ as if an iron band surrounded it.” Or, again, it may involve much wider areas, the entire head feeling as if encased in a tight-fitting cap.

(b) In the case of the second class of abnormal cephalic sensations—viz., heaviness of the head—the descriptions given are : “ head as heavy as lead,” “ head top-heavy,” or the patient

“has to hold his head up—it is so heavy,” or there is “a sensation as if a heavy load were at the back of the head.” In these cases the sense of pressure may or may not be present.

(c) In the third class the vaguely defined sensation is not one of compression, nor of the head being unduly heavy; it is rather one of heaviness, or some allied sensation, usually described as felt within the head. It is, perhaps, like that which many feel before a thunderstorm, and probably answers to the *χαρῆβαρα* (*χαρῆ*, head; *βαρα*, weight) alluded to several times in the works of Galen. Among its causes he gives the south wind and too much sleep, or sleep at unwonted times, and another cause is referred to in a Latin translation of his works in the following terms: “*Alii, nisi assidue coeant, capitis gravitate molestantur.*”

Any of these three varieties of sensation may occur with or without pain; moreover, pain may be felt simultaneously with, but distinct from, the sensation of pressure or heaviness; or the two may be so blended that the patient complains of a “heavy agony” or a “pressing pain.” Again, they may be unattended by any other abnormal sensations, or they may occur in combination with tenderness, burning, irritation, a sense of coldness, &c. Pain, tenderness, and pressure perhaps constitute the most frequent combination. When pain and pressure are felt on the crown, the part generally involved, it is not uncommon for the patient to complain of feeling “as if he would go out of his mind.” Pain and pressure are frequently felt in the forehead.

The Eyes.—Patients often speak of a weight in the eyes, but it is difficult to determine whether the sensation is in the eyeball itself or in the eyelids. Sometimes it seems to be in the lids, the patient describing these as “feeling weighed down,” or “difficult to keep properly open”; or he complains of “a heavy feeling in the eyes as if they would drop out.”¹

Causation.—(I) Clinical aspect.—The above sensations are essentially manifestations of nervous debility, and Runge’s long article on them² is almost entirely devoted to a description of what would now be called the neurasthenic state. Gowers

¹ In George Meredith’s “*Diana of the Crossways*,” I read: “He felt a burning pressure behind his eyeballs.” ² *Archiv f. Psych.*, Band vi., p. 627.

regards the sensation of pressure as a symptom of hypochondria, and maintains that it is more frequently met with in men than in women. I find it, however, exceedingly common among the latter, especially in those who are debilitated from excessive nursing or from poverty, those who are suffering from menstrual derangement, and, above all, in those who are passing through the climacteric. Besides general nervousness other factors in causation may be noticed. Such are: (*a*) catarrh of the frontal sinuses; (*b*) affections of the eye—*e.g.*, errors of refraction; (*c*) ear-diseases, the sensation being often limited to the side of the head on which the ear-disease is situated; (*d*) syphilis, of which some have thought the sensation when increasing at night to be pathognomonic,¹ but this is certainly not the case.

(2) Anatomical aspect.—Concerning the anatomical changes which lead to these sensations little can be said. Ziem suggests that congestion of the superior longitudinal sinus and its emissary veins may lead to vertical headache and a sensation of pressure, and Runge attributes the latter to circulatory disturbances causing pressure on the sensory nerves of the cranium and scalp. The feeling of tightness in the head, as if a tight skin were closely enveloping the cranium, or a firm cap compressing it closely, may possibly be associated with local vascular distension. Gowers regards the sensation of vertical pressure as of mental rather than of peripheral origin. “Nerve impulses,” he writes, “in health unnoticed, must be continually passing from all parts to the centres, and they may be readily perceived if attention is directed to them If the reader will direct his attention to the vertex, he will probably soon be able to detect a distinct sense of pressure there, especially if he is fatigued or has been engaged in mental work.”² I have no doubt that attention may sometimes play a part in the causation of the sensation in question, but in the vast majority of the cases I have met with it has certainly arisen spontaneously.

Psychic Aspect.—Regarding the psychic nature of the sensa-

¹ “Die Syph. Erkrankungen des Nervensystems,” T. Rumpf, Wiesbaden, 1887, p. 252; also pp. 273 and 275.

² “A Manual of Diseases of the Nervous System,” 1893, vol. ii., p. 864.

tion of heaviness felt *within* the head I shall say nothing further than that it is essentially morbid, like giddiness—not related, that is to say, to any normal sensations, to any sensations met with in perfect health. The feeling of the head being abnormally heavy is, on the other hand, possibly referable to the muscular sense belonging to the muscles which support the head, just as a feeling of weight in the upper lids is probably referable to that belonging to the levatores palpebrarum. The pressure sensations are, I think, in the main modifications of cutaneous sensibility.¹

Sometimes, though much less frequently, there is a feeling the very opposite of top-heaviness, namely, of excessive lightness of the head. Thus, one patient declared that his head felt as “light as a cork,” and I have met with a fair number of very similar cases. As with the former class, so with these, it seems probable that the sensation is a modification of the muscular sense.

¹ I have treated the subject of this chapter at considerable length in the *Journal of Mental Science*, Jan. 1893.

CHAPTER XI.

THE SENSATIONS OF HEAT AND COLD.

*The Sensation of Heat.*¹—The sensation of heat in the head is described in such terms as the following:—"Burning," "burning fire," "scalding," "like a ball of fire," "like a hot plate on the crown," "like warm blood on the crown"; it may occur independently of any other sensation but more frequently it is accompanied by pain, which is nevertheless separate and distinct from it, my notes in a large number of instances running—"pain *and* burning," "ache *and* burning heat in the same place," "ache *and* burning like fire," and so on. In other cases the sensation of heat and the pain are so intimately blended that it is difficult or impossible to dissociate the two, just as it is often difficult to separate pain from the sensation of weight when they occur together; thus the patient may complain of a "burning pain," a "burning smarting," a "hot, burning pain," a "burning, darting pain," a "burning headache." But while some of these cases doubtless belong to the last category, are a blending of independent pain and burning, in some instances they are probably *simple* burning pains, like those known to occur in neuralgia. It may here be remarked that a "burning pain" is quite different, both psychologically and physiologically, from the simple sensation of heat; it is not merely the sensation of heat intensified: there are special end-organs (and presumably, special central arrangements also) for the appreciation of heat and of pain respectively.

¹ The following occurs as a heading in Avicenna's "Canonæ": "Designificationibus sumptis a gravitate, et levitate capitis, caliditate, et frigiditate, et ex doloribus," lib. iii. fcn. i. tract. i. cap. xii.

The Situation of the Sensation of Heat.—The abnormal sensation is in the very great majority of cases felt in the crown; sometimes chiefly or only in the posterior part, at others chiefly or only in the anterior, but, as a rule, the patient in indicating the seat of the pain places the hand somewhat indefinitely on the top of the head. The forehead and occiput are much less frequently involved. In one case the burning extended from the occiput along the back of the neck.

Occasionally the sensation is asymmetrical, as in the following cases :

Scalding headache on crown and right side.

Localised patch of pain, which is burning and tender.

Patch of baldness over parietal bone; burning here.

Burning heat, involving chiefly the left side of the head, and left eyeball.

The eyes, as in the last case, are not infrequently involved.

As a rule, the sensation, when affecting the scalp or forehead, is felt superficially, but occasionally it is more deeply seated. Thus one patient complained of burning *in* the brain, *under* the bones of the skull.

The sensation may occur in association not only with pain but with other abnormal sensations, as pressure, irritation, and soreness, a fact which shows that it has a quite independent nervous mechanism.

Burning	×	×	×	×	×	×	×	×	×	×	×	×
Irritation								×	×	×		×
Pressure	×	×		×		×						
Tenderness	×	×	×		×					×	×	×
Pain .		×	×			×	×		×		×	×

The above table, constructed from my notes, shows combinations which I have observed. In these the combining

sensations involved much the same, though not always identical, areas at the same time, but this does not follow as a matter of course, quite different areas sometimes being involved. Thus there may be frontal ache with a burning and tender vertex.

The most common combination is that of burning, tenderness, and pain.

*The Sensation of Cold.*¹—The sensation of cold is much less frequently felt in the head than the sensation of heat. The following are examples :—

Complains of a heavy, cold weight on the vertex.

Has a cold feeling, as of ice being applied to the crown. There is a sensation of pressure here ; also soreness.

Complains of the crown being sometimes cold, sometimes hot.

Suffers from a sensation of cold, chiefly on the top and left side of the head.

Complains of a sensation of cold running up the spine, and settling on the vertex.

It will be seen from the above cases that the sensation of cold, like that of heat, is most frequently felt on the crown. The case in which there was the feeling of a cold weight there is interesting as paralleled by that already cited in which the patient complained of a feeling as of a hot plate in the same situation.

¹ "Dolores capitis ab utero nati verticem ac occiput, cum sensu frigoris in vertice, sæpissime occupant." Klein, quoted by Labarraque ("Essai sur la Céphalalgie," Paris, 1837, p. 6.) This observation was, however, first made by Langius, who refers to the vertex in the following terms: "Ubi mulieres glaciei frigus et pondus se sentire asserunt." (Langius, liber i. epist. 49.) See also L. Bellini, "De Urinibus et Pulsibus," Franc., 1685.

CHAPTER XII.

IRRITATION, SENSATION OF BURSTING, NUMBNESS.

Irritation.—The terms used to denote the sensation treated of here are, “itching,” “irritation,” “crawling,” “creeping,” a feeling of “something alive” in the head, or as if “something were trickling” on the crown. The sensation may vary from slight and quite bearable itching to irritation of such severity that the patient feels as if he could “tear the head to pieces.”

A very common cause of slight itching in the head is scurf, especially if occurring in small patches; there may, however, be much scurf present yet no irritation. Pediculi are, of course, a common source of itching,¹ but it may be well to mention that I have frequently met with abundant nits and pediculi in patients who have denied that they experienced any discomfort from them.

Skin diseases—*e.g.*, eczema of the scalp—constitute another fertile source of irritation in the head. In this chapter, however, I am taking no account of the irritation that may arise in connection with these local causes, but of a form which appears to depend upon a peculiar condition of the nervous system, and which for the want of a better name I shall term “nervous itching.” In order to show that the cases I refer to have such an origin, let us first notice where the irritation is most frequently felt.²

Out of fourteen in which the situation of the sensation was noted, in nine it was felt on the crown, and in two of them the posterior part was specified. In three cases the head was said

¹ See case described by R. Neale, *Brit. Med. Jour.* 1884, vol. ii., p. 1107.

² Day refers to two cases in which the scalp itched so much that the patient could not help scratching his head incessantly, “Headaches,” Lond. 1677, p. 163.

to itch all over, and in one of these the irritation was most intense on the top. In another case the sensation involved the left parietal base, and in yet another, the frontal region.

Now the facts that in the great preponderance of cases the sensation was felt in the crown—the region which is *par excellence* the seat of abnormal cephalic sensations; that in two of them it was confined to the posterior post-vertex; that in one the forehead was the seat, and, finally, that in none was any abnormal state of the integument discernible, strongly suggest that it was primarily nervous. Further evidence in favour of this view is afforded by such cases as the following :

Complains that the irritation is worse when the “nervous feelings come on.”

Complains of great itching in the head after the headache.

Has attacks of intolerable itching in the posterior vertex; these last ten minutes or so, and are followed by pain.

Complains of itching in the head at every monthly epoch.

Feels as if something were crawling on the top of the head; had a similar attack eight years ago, with nervousness.

Before the pain comes on, complains of itching on the left parietal region; pain is chiefly confined to this region.

Nervous itching is most common, I have thought, in highly nervous patients who are physically greatly reduced, as for example, in the thin and bloodless, such as are so frequently observed among the married women attending the out-patient departments of our hospitals, but as it is precisely among these that pediculi are apt to swarm, it may perhaps be for this reason that I have come to associate irritation of the scalp with a very broken state of health.

Irritation	×	×	×	×	×	×	×	×	×
Pain .			×	×	×		×		×
Tenderness	×		×	×	×		×	×	
Pressure	×	×			×		×		
Heat .				×		×		×	

The foregoing table shows combinations of irritation with other abnormal sensations. As with the sensation of burning, so with this—the areas involved by the sensations entering into combination with it are not necessarily exactly the same.

While the sensation of irritation may combine with any of the other sensations, it may occur independently of them. Thus, some of my notes on these cases expressly state, “no tenderness,” “no pressure,” “no heat,” “no pain.” It is most frequently associated with tenderness, which indeed was absent in three cases only; next in frequency of association comes pain; after this, pressure-sensation; and finally, the sensation of heat.

We here again see that the sensation of irritation, like that of heat, has a nervous mechanism independent of that of the other sensations.

The Sensation of Bursting.—The following cases are examples of the sensation of bursting. They were all women: ¹

(1) *æt.* 32. Nothing 2 M. Head feels, when lying down, as if it were going to burst. Is very tender.

(2) *æt.* 42. Anæmic. Irregular since last child. Has a feeling as if something were going to burst in the head.

(3) *æt.* 41. Irregular 4 M. Has bursting sensation across the forehead.

(4) *æt.* 41. Regular till last period. Came on yesterday (fourteen days). Head feels pale, as if it would burst; not much tenderness.

(5) *æt.* 41. Irregular. Nothing 2 M (always little). Seems as if her head would burst when the heats come on. Head tender.

(6) *æt.* ? Nursing 13 M. Anæmic. Has a bursting sensation as if the skin of the head were too tight. Often tenderness.

(7) *æt.* 41. Nothing 3 M. Head worse during this period. Feels as if the forehead were going to burst. Great tenderness.

(8) *æt.* 22. Nursing 12 M. Bursting sensation in the head; much worse during cough.

(9) *æt.* 43. Regular but less. Bursting sensation in the head; cannot stoop on account of it.

The sensation of bursting is stated by some authors to attend the plethoric and hyperæmic headache. We may receive the statement with some caution, since the conclusion is naturally

¹ Galen has the following passage: “*Alii caput contundi distendique sentiunt.* —Kühn’s Latin transl., vol. viii., p. 204.

arrived at by *a priori* reasoning apart from observation. It is, however, probable that in some cases, at least, the feeling results from vascular turgescence, for it will be observed that three of the above nine were instances of climacteric amenorrhœa (Nos. 5, 7, 9). Further, in one of these (5) the patient complained of the feeling when the flushes came on, at which time there is certainly a vascular distension of the head, though not necessarily of the deep-seated structures. The sensation is, I have observed, very commonly felt during flushing.

In cases 2, 6, and 8, however, the patients were emphatically anæmic—in two from over-nursing—and obviously in these, excess of blood (plethora) could have nothing to do with the feeling. A local hyperæmia, which frequently occurs in anæmic states, might, on the other hand, have been the cause.

That the bursting sensation arises from vascular distension is definitely shown by the influence of posture in inducing it. Any one may cause it in himself—in a small degree, at least—by hanging the head down, and those who in the upright posture experience it are made much worse by this proceeding (*see* No. 9). Indeed, the mere act of lying down may bring on the sensation in those predisposed to it (as No. 1). Hence, such patients are always better in the upright position. Again, the fact that coughing may induce it or render it worse (as in No. 8) is a further proof that it may be the result of vascular turgescence.

It is felt most frequently and chiefly in the forehead. In the case of No. 6, the sensation was apparently allied to that in which the head seems to be tightly fixed by some rigid cap.¹

Sensations of Numbness, Pins and Needles, Giddiness, etc.—Numbness is frequently felt in various parts of the body. It is most common in the fingers, where it is often associated with pain. It is not surprising, therefore, to find it occurring in the head in connection with headache.² The following are examples :

¹ *See* p. 280.

² Celsus alludes to numbness, itching, and cold in the head (lib. ii. cap. 8.), but not where he treats particularly of headaches : Vaughan, "An Essay on Headachs," Lond. 1825, p. 34. Morison mentions the sense of unilateral numbness and weight which sometimes occurs in ear disease. *See Practitioner*, vol. xxxvii., p. 173.

Has attacks of numbness and pain in the left side of head, and numbness in the hands.

Has a "numbing pain" in the left side of the head. (Another patient like this.)

Pain and tenderness at the back of the neck and occiput; numbness behind the ears. Vertical pressure.

The numbness may occur in the head, as in other parts of the body, independently of pain :

Complains of numbness, sometimes on the nose, sometimes on the vertex, at others in occipital region; describes it as "a dead sort of feeling;" is compelled to put hand to the affected region. Sometimes the scalp is sore all over, before the numbness occurs.

Has a feeling of great pressure and numbness on the crown.

The sensation of pins and needles is often experienced, as is well known, in connection with numbness, and it may be felt in the head either with or without pain :

Sometimes suffers from "pins and needles" in the crown and occiput.

Sometimes *before* the headache begins, has a sensation of "pins and needles on the side of the head, as if the veins were curdling."

CHAPTER XIII.

GIDDINESS, TINNITUS AURIUM, AND OTHER SENSATIONS.

Giddiness.—I do not propose to enter in detail into the subject of giddiness, since this has already been ably done by more than one writer.¹ I shall merely describe it briefly under its aspect of a purely functional disorder in women, not concerning myself here with its pathology.

The following observations are founded upon an analysis of fifty out of a large number of cases (women) in my notebook.

Giddiness is very common in women, far more so than in men, being in them almost as characteristic a symptom of nervous debility as “flushes,” and it may be caused by all the conditions that cause the latter. It is a common result of menstrual suppression, and it is above all characteristic of the climacteric. It may either occur as a more or less continuous symptom, lasting for days, weeks, months, or even years; or it may be of only temporary duration, coming on, perhaps, quite suddenly, and lasting from a few seconds to a few hours. As an instance of chronic giddiness, I may cite the case of a patient who complained that she had been an almost constant victim to it during the seven years succeeding the climacteric. The suddenness with which the symptoms may come on is quite remarkable, and suggests that the nervous perturbation underlying it is of the nature of a nerve-storm. It may indeed occur as part of some such well-recognised nerve-storm as epilepsy, or a so-called “flush;”² but it may also be itself the most

¹ See particularly Gowers, “A Manual of Diseases of the Nervous System,” 1893, vol. ii., p. 777.

² See “Flushing and Morbid Blushing,” Lond. 1890, by the author.

obtrusive evidence of the storm, so that we find large numbers of women, especially the middle-aged, seeking advice for sudden attacks of giddiness. Doubtless these attacks are as complex in their nature as I have shown the flush-storm to be. Thus they may be complicated by nausea, vomiting, cardiac disturbance, visual defects (such as obscuration of vision or quivering before the eyes) and tinnitus, which, however, is only present in a small proportion of the purely functional cases. In one patient diarrhœa occurred after the giddiness.

As regards the causes assigned by the patients : sometimes the attacks come on quite suddenly, without any obvious cause, as, for instance, when the patient is sitting quietly sewing, or doing nothing at all ; in other cases, effort—*c.g.*, going upstairs, or alteration in the position of the head, as when the patient assumes the erect posture after sitting or lying down—may excite an attack ; simple flexion or extension of the head while in the erect posture may also produce it :

If she puts the head down, or leans forward, feels as if she must fall on her face.

If she looks upwards is seized with giddiness.

One patient complained of giddiness after drinking anything, “even a glass of water.”

The attacks may occur by day or night, indoors or out. Over and over again I have known patients fear to go out-of-doors on account of attacks of giddiness seizing them in the streets :

Has severe attacks of giddiness when she goes out in the open air.

Complains of dreadful giddiness ; often feels as if she would fall backwards in the streets.

Suffers from giddiness, especially when in the street ; the latter “seems to be going up and down.”

“Comes on so giddy” when walking in the street that she is afraid to go out.

Turns very giddy when walking out of doors.

Feels as if going to fall forwards when she walks along the street.

When in bed the patient often feels as if she were suddenly falling through space.

The sensation varies in nature from an ill-defined sensation of swimming, mental confusion, or loss of equilibrium, to a highly specialised sensation of movement in a definite direction.

Obscure Sensations :

- Feels a swimming and confusion.
- Feels dizzy in the head.
- Does not know what she is doing; forgets things.
- Feels as if going to lose her senses.

Loss of Equilibrium :

- Feels giddy, "as if tipsy."
- Feels "as if she had taken too much."
- Feels "as if the street were going up and down;" not able to walk straight.
- Feels as if she would fall (many).
- Seems to stumble.
- Feels as if she would reel over.
- Easily loses balance.

More Defined Sensations :

- Feels as if sinking through the earth.
- Feels as if walking to the left side.
- Things seem to move from right to left (two cases).
- Things seem to move both ways.
- Feels as if she would fall forwards (many).
- Feels as if she would fall backwards.

Not only may the patient feel as if she were going to fall, but she may actually do so: this had occurred in five out of the fifty cases.

Tinnitus Aurium.—On this subject it would be difficult to say anything new, but a brief notice of it is desirable. Tinnitus rarely occurs in the young, not generally making its appearance until middle-life, after which the tendency to it increases every year, and so distressing may it be as even to prompt to suicide. In seeking for its causation we should be on the look-out for gout, syphilis, chronic alcoholism, anæmia, plethora, neurasthenia, Bright's disease, high arterial tension, and digestive disorders. Anything which lowers the health predisposes to it, and, as a consequence, the intensity of tinnitus may frequently be observed to rise and fall with variations in the bodily health, the affection often wholly disappearing as the latter gradually improves. Among general causes must be numbered the nervous diathesis, and it shows a peculiar proclivity to occur in those who are liable to neuralgia, headache, and other abnormal

cephalic sensations. It may also be induced by certain drugs—*e.g.*, quinine and salicylate of soda.

More immediate causes are disorders of (1) the external auditory meatus; (2) the tympanum; (3) the labyrinth; (4) the auditory nerve and centre. It may further occur from some abnormal vascular condition in or about the peripheral organ of hearing.

(1) Disease in the external auditory meatus provokes tinnitus by pressure on the drum, the pressure being transmitted through the ossicles to the labyrinth. Any one can produce tinnitus in this way by forcibly pressing the tragus inwards, and a mass of hardened cerumen often acts in the same manner as pressure voluntarily applied. (2) Any disease of the middle ear may cause it—*e.g.*, increase or diminution of intra-tympanic pressure, whereby the pressure in the labyrinth is modified; exudation into the tympanum may cause crackling; abnormal sounds may further be set up by contraction of the stapedius and laxator tympani, and not infrequently by polypus. Tinnitus rarely occurs when the drum is perforated. (3) Labyrinthine causes are more obscure, but they are certainly responsible for a large number of cases. (4) Involvement of the auditory nerve or centre in gross organic disease may cause tinnitus, or it may occur as a result of some functional aberration of the centre.

In all cases of tinnitus, therefore, the auditory system must be subjected to searching examination.

The sound may be heard in one ear only or in both, in the head or outside it, in which latter case it constitutes a hallucination. In the sane the purely subjective nature of the sound is soon recognised, although in the first instance it may be thought to proceed from some external object; but to the insane it always appears objective.

The sound may be continuous and unvarying, or it may be continuous and undergo rhythmical intensification, or, again, it may be rhythmically intermittent, the rhythm in the two latter cases corresponding to the pulse, and showing that the pulse plays some part in causation. Hearing may, or may not, be impaired, but even when normal it is generally rendered less acute while tinnitus lasts.

Other Sensations.—The following sensations cannot well be classified :

Has a “curious” feeling in the post-vertex.

A “creepy” sensation passes backwards and forwards over the crown.

Complains of a “working,” a “quivering” on the crown.

Has a peculiar “beating” on the crown; also in the arms.

Complains of a “beating,” “like little birds fluttering and jumping about,” in the mid-occipital region.

Feels “as if the head were coming off.”

Sometimes feels “as if the head were swollen up” (another like this).

Feels “as if the head were too big for the shoulders.”

Feels “as if head were getting bigger and bigger.”

CHAPTER XIV.

CERVICO-OCCIPITAL AND OCCIPITAL HEADACHE.

IN this chapter we shall consider cervico-occipital pains—pains involving the back of the head and the neck ; and it will also be convenient to treat of certain cases of simple occipital headache.

The cervico-occipital pains which I shall here describe practically correspond to the cervico-occipital neuralgia of authors. The nerves affected are the great and small occipital, and the posterior branches of certain spinal nerves. Most authors limit the number to the four upper cervical, but, as we shall see, many more may be involved. The pain may extend to the interscapular region, shoulders, and arms, or, indeed, even as far as the sacrum. Nor can we restrict the nerves involved to the posterior branches of the cervical nerves, for the superficial cervical plexus is often implicated.

Nothing more conclusively shows that the pain of headache may involve structures other than the brain and its meninges than the fact that it may spread to parts situated below the base of the skull. If, for instance, we find pain occupying the occiput, neck, and shoulders at one and the same time, or spreading from the one to the other—let us say from the shoulders or neck upwards—we may safely conclude that it involves cephalic structures situated outside the meninges, even though we may not be able to exclude these or the brain from implication in it.

The fact that occipital pain may involve the back of the neck has long been known. Thus C. Aurelianus says of the pain of headache : “ It may even occupy the roots of the eyes, and the occiput, extending along the spinal region,”¹ a remark which

¹ “ De cap. passione quam Graeci cephalæen nominant.”

shows close observation. Galen also speaks of pains and weight affecting the head and neck.¹ One of Wepfer's patients complained of a pain which seized him in the nape of the neck, spreading thence to the forehead above the root of the nose;² and Riverius describes the very common case of a patient who was suffering from heavy pain in the occiput: "*cum tendinum cervicis dolore.*"³ Wepfer also records a case in which the pain involved not only the neck but the inter-scapular region,⁴ and another in which the occiput, neck, scapular, and pectoral regions were all affected.⁵ In the "*Sepulchretum*," again, is recorded a case of a most violent headache, "*cujus dolor etiam occiput spinamque occupabat*;"⁶ and Vaughan also alludes to the involvement of the neck in headaches.⁷

Cervico-occipital neuralgia has, however, only been definitely described within recent times. Valleix⁸ publishes eight cases, from his own practice and that of André and Bérard, the latter of whom was, he says, the first properly to define the disorder, and the accounts of it since given by Erb,⁹ Anstie,¹⁰ and Grasset¹¹ seem to have been largely inspired by his remarks. The causes of cervico-occipital pain may be divided into *organic* and *non-organic*. The former include gross organic disease of the brain, meninges, occipital bone, cervical cord and meninges, and cervical spine. It is well known that cerebellar tumour is wont to cause occipital pain, but the fact that the pain may also involve the back of the neck is sometimes overlooked. As an instance of this implication of the neck, I may cite a

¹ Kühn's edit., vol. 17A, p. 151.

² The following are the patient's own words: "*Dolor me cruciabat in nuca, qui sese extendit, ad frontem usque supra nasum, imprimis inter respirandum, aut alvum exoneraturus, aut si caput elevare velim.*"—"De Affectibus Capitis," Scaph. 1727, p. 80.

³ Lazari Riverii, "Observationes," Centuria 1, obs. 54, Hagæ Comitum, 1656.

⁴ *Op. cit.*, p. 150.

⁵ *Ibid.*, p. 78.

⁶ T. Boneti, "Sepulchretum," Lug. 1700, p. 37.

⁷ "An Essay on Headachs," Lond. 1825, p. 36.

⁸ Ziemssen's "Encyc.," vol. xi., p. 129.

⁹ "Traité des Névralgies," Paris, 1841, p. 227 *et seq.*

¹⁰ "Neuralgia and the Diseases that resemble it," Lond. 1871, p. 32.

¹¹ "Maladies du Système Nerveux," 1879, vol. ii., p. 149.

case of Bastian's: just before and with the sickness the patient "usually complained of severe pain in the back of the neck and in the occipital region."¹ In the basic meningitis of children, also, the head retraction is apt to be accompanied by pain in the occiput and neck. Malignant disease of the cervical spinal, hypertrophic pachymeningitis, and vertebral caries involving the atlas and axis, may cause very serious cervico-occipital pains. Hilton records several instances of the latter, and I also think it very possible that rheumatoid arthritic disease of the cervical spine may occasionally be a source of pain in this region, for sometimes patients suffering from it complain of a *grating* upon moving the neck.

Cervico-occipital pain resulting from organic disease is, however, rare compared with that having a non-organic origin. This is very common in women suffering from debility, which, as a matter of fact, is very frequently the only cause that can be assigned. It frequently attacks women of the poorer classes, and is often observed in connection with irritability, depression of spirits, and other signs of nervous break-down. It did not, therefore, surprise me to find that Burnett describes "nuchalgia" as one of the premonitory symptoms of melancholia.² It is certain that the muscles of the occiput and neck are often involved in cervico-occipital headache, the patient frequently complaining of stiffness in these parts, so that the affection, especially when resulting from cold, might be described as muscular rheumatism. It is undoubtedly sometimes caused by cold, and in many cases is relieved by salicylate of soda. Among the poor, pediculi constitute another accessory cause, and one which is often overlooked. No part of the head is so apt to harbour these parasites as the occipital region—that most thickly covered by hair—and often when the head appears perfectly clean at first sight, more careful examination of this part will show it to be far otherwise. Dyspepsia, again, is an occasional cause. Thus, as is well known, it sometimes happens that the dyspeptic pain involves the inter-scapular region, and in such cases it sometimes spreads up the neck to the occiput. Uræmia may also cause cervico-occipital pain. More than one writer alludes to the uræmic headache involving by preference the occipital region,

¹ *Lancet*, 1878, vol. ii., p. 207.

² See Haig's "Uric Acid," p. 129.

but Bartels and Sir W. Roberts speak of the nucha as being also affected, the former writing that the headache which so frequently accompanies granular kidney may involve the neck and even the brachial plexus,¹ and Roberts stating of uræmic headache that: "Sometimes the pain is obstinately fixed at the back of the neck."² Pain of the occiput and nucha is also apt to occur in connection with pharyngeal disease.³ Thus, I have more than once known sore-throat give rise to characteristic cervico-occipital headache. I may also mention here that I have met with a case of genuine megrim in which the pain involved the nucha and occiput, and conformed in other respects to cervico-occipital pains of non-megrinous nature.

All these causes of cervico-occipital headache may also cause simple occipital headache. It will readily be seen that there may be a simple occipital headache which clinically admits of classification with cervico-occipital ache; which is, in fact, the latter *minus* the cervical pain. It is of this kind that I shall treat in this chapter.

I now proceed to analyse my cases.

Of ninety-nine cases of pain involving the occipital and cervico-occipital regions and shooting in a definite direction, in only eight did it pass downwards. In the remaining ninety-one it ascended.⁴ In twenty-five of these the pain began in the occiput, while in sixty-six it started in some part below it. It is easy to understand, at any rate in part, why in the former cases the pain should pass upwards, for the occipital nerves pass in this direction, and pain generally passes towards a nerve-periphery. Why, however, the pain when it begins below the occiput should almost always do the same is not so clear. Without attempting to offer an explanation of this tendency, I may merely mention the fact that the same is true of other sensations showing a tendency to spread. A flush, for instance, beginning in any part of the spinal or cervical region and spreading thence, always, in my experience, ascends. I have never—and I have made this a special study—known it to descend.

¹ Ziemssen's "Encyc.," vol. xv., p. 420.

² "Urinary and Renal Diseases," Lond. 1885, p. 475.

³ Vergely, Legal, Ziem. See p. 102.

⁴ In the few cases given by Valleix in which the direction of the pain is alluded to, it passed upwards.

As instances of other sensations than pain passing upwards, I may cite the following cases :

A sensation rushes up the back to the head.

A curious sensation runs up the spine.

Numbness starts at seventh cervical vertebra behind, and passes upwards over the back of the neck to the head.

A numbness starts at the upper sacral region, and passes up the back to the head.

Suffers from feeling of lightness in the head. This begins with cold shiver at the back of the neck, the cold sensation gradually passing up the neck and over the head to the forehead.

Among those numerous cases of pain which began below the occiput, let us first consider those in which it started *below the neck*. Of twelve such cases, the following are examples :

Dull, heavy pain starts at upper sacral region, creeps up the back to the posterior neck, and thence over the head to the forehead ; takes five minutes. Patient is hot during the pain, and cold after ; may have five or six such attacks during the day. (Two other very similar cases.)

Pain starts in the middle of the back, and passes up between the shoulder-blades to the back of the neck. (Patient then feels as if some one were gripping her.) Thence it passes to the occiput, and through the head to the back of the eyes. With the sensation of being gripped, there is a feeling of choking and a faintness.

Nursing : knife-like pain shoots through the chest, and ascends the middle of the back and posterior neck to the top of the head.

Pain spreads up from the intra-scapular region on either side of the spine, and then up the neck to behind the ears, passing finally to the vertex.

Pain begins between the scapulæ on either side of the vertebral spaces, and about one and a half inches external to them ; it shoots up either side of the posterior neck to the posterior crown.

In these cases we have good illustrations of the two methods by which pain may spread—viz., either suddenly or gradually. Other sensations vary similarly in their manner of spreading—flushes, for instance. It is expressly stated in Valleix's fifth case that the pain *gradually* spread towards the anterior part of the skull.

We turn now to those cases in which the pain started *in the cervical region*. Both sides of the neck and occiput

were in most cases affected, but one side usually more than the other, and this peculiarity seems to have been noticed by all who have written on the subject. Grasset maintains that we should look with suspicion on a persistent bilateral pain in this region, but he should, I think, have said "on a bilateral pain that is equally severe on both sides," for, as we have just seen, pain here is usually bilateral.

The following are instances of unilateral cervico-occipital pain :

Pain starts at the right side of the neck, and passes "like a knife" behind the right ear to the right parietal region (=great auricular nerve [?]).

Sharp pain in left upper neck ; shoots to left eye.

Pain shoots up left neck to left occipital region.

Cases of neuralgia involving one-half of the neck and occiput and the corresponding half of the face :

Patient was attacked with facial neuralgia (of inferior maxillary chiefly) on the left side ; after a week of this, other pains, shooting up the left side of the neck (chiefly behind) to the vertex, were added.

Patient has neuralgia in the left side of the neck, occiput, and face. The pain in the neck shoots upwards.

Pain starts in the left side of the neck low down and slightly posteriorly, and shoots upwards to behind the left ear and into it ; also up into the left jaw, and even involves the whole of the left side of the face.

Mention may here be made of three cases in which the pain passed up from one shoulder to the head, although it was not always strictly unilateral :

Suffers from pain in several joints. Pain may start in either elbow and affect the corresponding side of the head, chiefly the mastoid region—one side at a time. Usually it passes up slowly, occupying in its passage from five to ten minutes ; more rarely, it shoots up.

Has pain in several joints. Sometimes dull, gnawing pain passes gradually up from the right shoulder to the head.

Has pain in the left shoulder, which constantly shoots down to the fingers ; also pain which shoots up the left neck to the occiput and vertex.

The following are examples of bilateral cervico-occipital pains :

Sharp pain shoots from back of neck to crown.

Heavy, dull pain starts in posterior lower neck, gradually spreading upwards to the occipital region.

Headache starts at upper part of posterior neck, chiefly at the sides, especially the right side, and gradually involves the head. Or the pain may shoot up suddenly.

Pain starts at either side of the back of the neck, and shoots up to the vertex.

Pain shoots from seventh cervical vertebra to crown in momentary flashes. May continue thus to shoot perhaps for hours.

Pain shoots up the back of the neck (left side chiefly) and over the left side of the head to the left side of the nose.

When pain is absent, has a sensation of pressure in the left vertex.

Pain starts at seventh cervical vertebra and shoots over head to bridge of nose. (Both sides equally affected when the patient was first seen, but subsequently the pain was felt chiefly on the right side.)

Pain runs up posterior neck, over the ears (not vertex), to above the eyes—"like a sharp instrument sticking into him; makes him wince." Has such attacks two or three dozen times a day.

Case of Graves' disease. Pain shoots up back of neck to vertex.

Case of megrim, in which the pain starts in the middle of the posterior neck, and creeps gradually up to the posterior vertex, when it is so severe that he has to pace the room with it.

Patient suffering from sore throat. Pain seizes him in the throat, then shoots through to the back of the neck, darting thence upwards.

Here again we see that the pain may spread up gradually or suddenly. In one of the above cases (third) it spread in both these ways. Those cases in which it spread gradually are, however, exceptional. In most there was a more or less continual ache (and soreness) in the affected part, and upon this was engrafted, so to speak, the neuralgic pain. Hence, clinically speaking, they may be regarded as cases of headache. Those authors who have described cervico-occipital neuralgia have probably had in view very severe cases of neuralgia. The majority of cases of which I am now writing belong to the minor forms of neuralgia.

Point to which the Pain extends in Cervico-occipital Shooting Pains.—In most of the cases the pain stopped short at the vertex, in some spreading no further than the occiput; in a few it seemed to strike into the mastoid region (“behind the ears”), and even to the eyes; in others, to the nose, involving one or both sides of it; while in others again, it passed to the forehead. Often the neuralgic shooting would seem to leave a localised ache in some part of the head—*e.g.*, one mastoid or parietal region, one side of the forehead, one eye; but in truth it is almost impossible to get the patient to localise the pain strictly, and this because it is so seldom confined to an area supplied by any one nerve. It is true that in some of the cases cited it would seem as though the pain stopped short at the limit of some particular nerve-distribution, in most instances ending at the crown, and though my notes do not say so, probably at its middle part, where the great and small occipital nerves terminate. Again, in one case there were indications of the great auricular nerve being specially involved, while in others the pain spread so as to include the region supplied by the ophthalmic division of the fifth nerve. Usually, however, the border of the painful region did not appear to correspond to the confines of any special nerve-distribution, but spread indefinitely over contiguous nerve-areas. Now, if we assume, as does the customary theory of neuralgia, that the “sensory” nervous matter in the lowest nerve-level is the affected tissue, we must also assume a very close connection between the “sensory” nervous matter of contiguous nerves, as close, in fact, as that between the sensory peripheries; and in this way we can account for the spread of the pain over wide areas—*e.g.*, from the back of the neck to the forehead. Indeed, if the accepted pathology of neuralgia be correct, it is difficult to explain why neuralgia should ever display a tendency to confine itself to the distribution of any particular nerve. In order to reconcile the undoubted fact that it does with the prevailing theory, we must suppose that the grey matter of one nerve is in a measure isolated from that of continuous nerves—an assumption which does not appear to be warranted, except, perhaps, in the case of certain special nerves. These considerations lend some

degree of force to Anstie's theory, which supposes not the grey matter but the ganglia of the posterior roots of the spinal nerves (and their analogues in the case of the cranial nerves) to be at fault, for each is probably to some extent isolated from the others. But I am myself, on the whole, rather disposed to believe that when the neuralgia is strictly confined to the distribution of one nerve, the origin of the trouble lies in the nerve itself. If we assume some irritation in the nerve, then we can explain the localisation of the trouble to the grey matter in connection with that nerve; otherwise it is not easy to do so.

Cases of Cervico-occipital Pain Shooting Downwards :¹

Pricking, shooting pain; starts at upper occiput, and shoots downwards to between the shoulders.

Sharp pain starts in vertex, passes forwards to the eyes, and backwards to the lower cervical region.

Circumscribed patch of dull, aching pain in left upper occiput; this sometimes shoots down the left neck.

Occipital pain, "like pins and needles," sometimes shoots downwards to between the shoulders.

Cervico-occipital Pain remaining Fixed.—The following are instances :

Has pain at the back of the head and neck when indigestion is more than usually bad.

When suffering from headache after food, feels it at the back of the eyes and neck.

Complains of gnawing pain at the top of the head, back of the neck, and between the shoulders.

Sore-throat and headache; pain and stiffness at the nape of the neck.

Seeing that pain is often felt between the scapulæ in indigestion, we need not be surprised at this dyspeptic pain occasionally invading the contiguous post-cervical and occipital regions, as happened in the first two of the above cases.

In the next cases no actual pain was felt :

Heavy weight and oppression at the occiput and upper part of the neck.

¹ A case of cervico-occipital pain which occasionally shot downwards is recorded in the *Lancet*, 1876, vol. ii., p. 893.

Feeling of "contraction" on the right side of the head and back of the neck.

Sore-throat and headache; stiffness in the nape of the neck.

Shooting Occipital Pain.—Of fixed occipital pains I shall say nothing here, but proceed to consider shooting occipital pains in which the neck is not involved:

Shooting and burning pain passes from occiput to eyes.

Shooting pain begins in occiput (right side) and shoots towards the right parietal region. An attack consists of two or three such shootings, and leaves a continuous ache.

Pain shoots from occiput to vertex.

Occipital pain shoots upwards and involves chiefly the left side of the head.

Pain starts from behind the ears, and shoots upward to the posterior vertex.

Pain begins in the occipital region, and gradually spreads to the rest of the head.

Most of the remarks concerning cervico-occipital pain apply also here. Thus the pain may spread suddenly or (as in the last case) gradually. It may be unilateral or bilateral, and, in the latter case involves one side more than the other. It may spread to any part of the head, and is not necessarily limited to any particular nerve-distribution.

We may now briefly inquire into the nature of the pain experienced in the cases described in this chapter, and the presence or absence of tenderness or other cephalic phenomena.

Nature of the Pain.—In the seven cases of cervico-occipital neuralgia described by Valleix, the pain was more severe than in the majority of my cases. Thus, in his third case it came like an electric shock, and was described as "shooting, tearing, throbbing, intolerable." In another the pain was so violent that it was attended by twitching of the affected part, the slightest noise or movement bringing on an attack. These cases are evidently of the most violent type. The shooting pain seems to be of the nature of an ordinary neuralgic paroxysm. In two or three cases it was compared to that which would be produced by a knife, or something sharp, running into the head; in most it was simply described as

shooting. One patient declared the pain was so sudden that he felt as if he must fall when it came on. The continuous pain so liable to persist between the paroxysms was, as a rule, less severe, though often sufficiently troublesome. Thus, one patient said she felt "as if dogs were gnawing at the back of the head;" another likened the pain to that which would be produced by the "sawing of bone."

Tenderness.—Of those cases in which the question of tenderness was inquired into, in one only was it absent. As a rule the tenderness was very marked and wide-spread. It is perhaps for this reason that I have not been able to discover the "*points douloureux*"¹ described by Valleix as occurring in cervico-occipital neuralgia, and mentioned by several writers after him. That such points are present in various forms of neuralgia there can be no doubt; but their detection requires the greatest care and a frame of mind quite unbiassed. It is always easy to find what one expects to find.

The tenderness in many of these cases seemed to involve not merely the skin but the muscles. Thus, stiffness of the neck is frequently complained of, especially upon movement.

Other Cephalic Phenomena.—In a large number of these cases other symptoms referable to the head were present, such as weight on the crown and pains in the forehead and eyes.

¹ Valleix describes the following *points douloureux*: (1) the occipital, which corresponds to the point of exit of the great occipital nerve; it is said to be situated between the mastoid process and the first cervical vertebra, but a little nearer to the latter; (2) the superficial cervical point, situated lower than the former, between the anterior border of the trapezius and the posterior border of the sterno-mastoid. Grasset also speaks of a cervical point.

CHAPTER XV.

PERIODICAL SICK HEADACHE—MEGRIM.

CLASSICAL megrim, by which I mean megrim as described by Liveing, though not uncommon among the educated classes, especially those leading studious lives, is comparatively rare among the uneducated poor. Periodical sick headaches are, however, common among all classes, especially in the female sex, so that it would be possible for any one attending the out-patient department of a large London hospital to obtain records of a considerable number of such cases in a comparatively short time. I first became alive to their frequency after reading Allbutt's lecture on "Visceral Neuroses," in which he observes that the so-called "bilious attack" is nothing but an attack of megrim. Since such bilious attacks are periodical, and consist chiefly of headache and bilious vomiting, we may very properly speak of them as "periodical sick headaches." Whether in all instances they are examples of megrim the future must decide, but that they frequently are there can be little doubt. Liveing expressly observes that many headaches may be essentially megrinous, though not strictly corresponding to the classical types of this disorder. Of the truth of this we may be assured, since diseases are not fixed and immutable types,¹ but infinitely variable in their manifestations. Our difficulty, at present an insurmountable one, is to erect a criterion for megrim. We shall, however, get over it, provisionally at least, by considering periodical sick headaches as forming a class by themselves, without concerning ourselves as to whether or not they constitute genuine megrim.

Classical megrim is far more specialised than simple bilious

¹ See "The Causation of Disease," Lond. 1889, by the Author, p. 335.

headache, in which such symptoms as *teichopsiæ*, *hemiopsia*, a sensation of numbness spreading up one arm, and *aphasia* are absent, but the former shades off into the latter. At the one end of the scale we have simple headache and vomiting, or headache and nausea, or, indeed, headache alone; and at the other end a highly specialised disorder, manifesting in its rise, culmination, and decline, a complex series of symptoms the adequate consideration of which would form a monograph in itself.

Probably there is some degree of innate weakness of the nervous system in all those who suffer from periodic sick headache, whether in the form of classical *migrain* or simple bilious attacks. Which type it shall follow depends chiefly upon the degree and kind of nerve-weakness, and upon the mode of life the individual leads. The greater the innate nerve-weakness, and the more intellectual and studious the life, the more likely is the attack to approach in character the classical type. If an individual not leading an intellectual or studious life develops *migrain* in a classical form, he almost certainly has a strong neurotic taint, and I should be greatly surprised if I did not find among his relatives a history of *epilepsy*, or *insanity*, or both. Classical *migrain* occurring in a highly educated person or one suffering much from eye-strain has not necessarily the same significance; nevertheless we may, I think, be sure that it never assumes its most specialised form except in a highly neurotic individual, and in my experience such individuals owe their neurotic diathesis essentially to heredity.¹

According to Haig, the *migrainous* seizure is induced by

¹ No doubt the influence of the environment is all important in the causation of disease. I have, indeed, harped on this string on almost every page of my work on that subject. Hence, unquestionably a *migrainous* individual who subjects his eyes to severe strain and who takes large quantities of nitrogenous diet, can often cure himself of *migrain* by wearing suitable glasses and diminishing the supply of nitrogen; but because this is so, he must not assume that his nervous system is perfectly sound, and place all the blame upon an error in refraction or diet. These errors merely disclose the latent weakness which exists independently of them, though but for them it might never have manifested itself; some, exempt from the like nervous weakness, will for years suffer the severest eye-strain and take two or three times as much nitrogenous food as is requisite without showing the slightest tendency to *migrain*.

uric-acidæmia, and that it is in many cases none can doubt who have carefully followed his work. Here, then, it might be thought, we have a criterion of megrim, but it is soon manifest that it will fail us; for, on the one hand, marked uric-acidæmia may be present without any sick headache whatever, and, on the other hand, it is at least possible—and I think even probable—that megrim may occur independently of uric-acidæmia. The latter is a point still to be decided, and I shall say no more about it here. In regard, however, to marked uric-acidæmia existing without megrim, Haig himself observes that it may cause other nerve-storms—*e.g.*, the epileptic fit. The nature of the nerve-storm is, in fact, determined in each case by the nervous idiosyncrasy, the paroxysm of epilepsy or of megrim being, as it were, organised within the nervous system. Hence we must regard the uric-acidæmia only as the spark—whether the only one or not has yet to be determined—which explodes the gunpowder: if there is no gunpowder, there will be no explosion.

The following account of periodic sick headache is founded upon an analysis of notes taken of some eighty cases of this disorder:

Time of Life.—A large number of cases begin at puberty, especially in the girl. Some, however, begin earlier. I have known them to set up at eight years of age, and very many appear to begin at the age of ten or eleven. It is common for the patient to declare he has had the attacks “since childhood.” One case began at twenty-five (unmistakable megrim); another at twenty-eight.

As the patient gets older, the attacks often, indeed generally, undergo a change in type, and sometimes disappear, either for a time or permanently. Thus one woman suffered from sick headaches from thirteen to twenty-five, when they ceased, to return again at thirty-six. Sometimes marriage or the birth of a child will cause the attacks to cease, or to undergo a change in type. They often get much worse as the climacteric approaches, and are then sometimes very troublesome.

Time of Day.—The attacks generally begin in the early

morning, either immediately upon waking or soon after; they may, however, start later in the day, and one patient declared "they might come on at any time."

Duration.—The duration of the attack is from a few hours to several days. Thus, in two cases it lasted usually from the morning till the afternoon; many lasted the whole day, and some two, three, and even four days. Such long attacks are not types of classical megrim, which generally lasts one day only; but, classical or not, they are common.

Frequency.—Classical megrim is apt to occur only once a month, and sometimes less frequently. The cases I am now describing, however, are much more frequent than this, some occurring every three weeks, others (and they constitute a large proportion) about every fortnight; others, again, every week. Thus, one patient asserted that the attacks occurred every Saturday or Sunday for years. I have more than once known the patient to suffer from them two or three times a week. The menstrual type is very common in women.

As with the type, so also in regard to frequency; it is apt to change from time to time:

Used to be every month; now two to three times a month.

Used to be every three weeks; now every fortnight.

Used to have them every ten days; now not so frequently.

Influence of Menstruation.—The influence of menstruation is very pronounced. The seizures occurred most frequently just before the flux, less frequently during it, and least frequently immediately after it.¹

Premonitory Symptoms.—It is well known that in classical megrim the patient often feels in unusually good health just before the attack. Haig explains this by the fact that the blood is then unwontedly free from uric acid. Several of my patients felt "brighter," "remarkably well," and so forth, the day before the seizure, and increase of appetite was specially alluded to by some. Symptoms, however, may begin to show themselves on the preceding night. Among these sleepiness has been often remarked, and I have met with more than one instance of it. But many of my patients complained of un-

¹ The influence of the menstrual rhythm upon headache in general is considered more fully elsewhere.

pleasant symptoms for a whole day or two days before the attack, and in at least two of these there was no reason to doubt that the cases were genuine megrim. The following are instances of megrinous or megrinoid headache which were heralded by unpleasant symptoms :

For two days before the attack feels very heavy, and bowels are confined.

Feels generally low spirited the day before ; has dimness of vision immediately preceding the attack.

Heaviness between the shoulders a day or two before the attack, "as if she could not sit up straight."

Has swimming in the head the day before the attack ; cannot do needlework then.

Feels very languid the day before the attack.

Of course it is possible that in some of these cases we have not to do with true uric-acid headache. I am inclined to think, however, that in some undoubted cases of this variety the patient feels worse than usual the day before the attack.

Nausea and Vomiting.—In all these headaches nausea, or vomiting, or both, were present : hence the name "sick headache." As, from the descriptions, it is clear that the vomited matter consists largely of bile, they are also known as "bilious attacks." Nausea generally precedes the vomiting, and does not make its appearance until after the headache has lasted for some time : for a period varying from nearly an hour to four or five hours. The retching is sometimes very violent, and may continue for several hours. Thus, in one case it lasted from the middle of the day till eight or nine o'clock in the evening. The vomiting seems to afford relief in all cases, and in some to terminate the headache completely.

Lauder Brunton suggests that the effort of retching does good by forcibly squeezing the bile between the anterior abdominal wall and the diaphragm, and so hurrying on the circulation of the blood and bile through the viscus, and we can hardly doubt that this is what actually takes place. It is indeed through the sickness which it induces and through the starvation which it necessitates, that "sick headache" does good. It is a friend in disguise.

There are other symptoms referable to the alimentary

tract besides nausea and vomiting. One patient suffered from diarrhoea with the headache; another noticed that the bowels were very confined for a day or two before the attack, aperient pills then taking very little effect. This same patient suffered from much flatulence throughout the headache. Another (already quoted) noticed heaviness between the shoulders some time before the attack came on.

The Secretions.—During typical megrim the urine, saliva, and other secretions—such, for instance, as the digestive juices (probably) and the sweat—are apt to be diminished. In a fair proportion of my cases the urine was less during the attack, being secreted in large quantities at the end of it. One patient passed water more frequently during an attack, but less at a time. In one case the patient declared that she passed scarcely any water the day before the attack, and that she was in this way generally able to tell when it was coming on—a case which, supposing it to be one of true megrim, does not harmonise with Haig's views. Dryness of the mouth and of the skin was also observed. One patient noticed his “mouth becoming moister and his skin breaking out in a profuse perspiration” at the end of the attack.

Symptoms Referable to the Eyes.—I have had few opportunities of carefully studying teichopsiæ. They are comparatively rarely met with among hospital patients. The following are cases in which a visual change preceded the attack :

Shadows before the eyes before the attack.

Sudden dimness of sight one or two hours before headache.

Sight becomes “dark” before the attack.

About half an hour before attack eyes go dim.

A quarter of an hour before the attack eyes go misty.

Goes nearly blind for about twenty minutes. Headache commences about one hour after this.

Confused vision before the headache.

The above are instances of inhibition. The subjoined are examples of irritation :

Before the seizure sometimes notices “coloured lights” before the eyes.

Notices "coloured stars" about half an hour before the attack.

Sometimes notices "stars" before the attack.

The attacks always begin with "dazzling before the eyes."

Attacks begin by seeing "bright lights, like lightning."

Attacks come on with a "thickness" in the eyes, chiefly the right. She sees "golden lattice-work—a sort of dazzling." Cannot then see clearly out of the right eye. This may last from twenty minutes to one hour, and leaves her with a bad headache.

A point of some interest to determine is whether, when one eye only is affected and the pain is unilateral, the eye affection and the pain occur on the same or on opposite sides. Some writers contend that the former, others that the latter, obtains. In only one case was I able to procure information on this head. In it the two were on the same side, and this I should expect to be the rule.

Position of the Pain.—In only a small proportion of my cases was the pain strictly unilateral. The headaches were, most of them, symmetrically situated over the anterior part of the head, either over the forehead alone, or over this region and the anterior part of the crown. In one case the pain was confined to the bridge of the nose and to the region just above it. In others—and they were few—it was more or less limited to one temple or supra-orbital region, the left side, as usual, being that most frequently affected. In two cases the patients declared it might be on either side. In a few it was chiefly vertical or occipital, while in two instances it was said to involve the whole head, and one of them was an attack of genuine megrim in which the pain was preceded by teichopsiæ.

Sometimes the pain gradually spreads to one particular spot, or, after occupying a comparatively wide area, gradually concentrates itself on a small part of it:

M. æt. 30 (genuine megrim). Attack begins in the early morning. Pain starts in the back of the neck and gradually creeps to the post vertex; it takes some hours to reach this spot.

F. æt. 33 (genuine megrim). Pain at back of the neck at night-time; in the morning it is felt chiefly at the occiput, and in the afternoon has reached the vertex. Eventually the pain settles chiefly over the right parietal bone. (Another case very similar to this.)

M. æt. 49. Begins in early morning as frontal pain, gradually shifting to the right side, where it remains.

In regard to the *nature of the pain*, it differs in no respects from that of non-megrinous headaches.

I have not thought it necessary to give a systematic account of classical megrim, partly because I have had frequent occasion throughout this work to refer to it, but chiefly because it has already been treated of most thoroughly and ably by Liveing. Before leaving the subject, however, I may note a few salient points concerning it.

The chief factors in the causation of genuine megrim are hereditary predisposition, abundant nitrogenous diet, and eye-strain.

Those who suffer from it have always highly strung nervous systems; they do not differ from the generality of people merely in having megrim, but in their entire nervous organisation. This is very often outwardly indicated by premature greyness.

Megrim is apt to disappear for years and then to recur without obvious cause, but on the whole it tends to diminish with advancing years.

Although the megrinous have generally high arterial tension, and would therefore, one would expect, show a tendency to premature arterial degeneration, they often live into ripe old age, possibly because their nervous sensitiveness and their headaches compel them to regulate their lives more carefully than others.

Megrim, as is well known, occurs in families in which other neuroses, such as epilepsy and insanity, are rife; if a member of such a family has megrim, he is less likely to develop those other neuroses than if he has not. Thus the child of insane parents who suffers from megrim will probably not become insane.

The relation of megrim to gout and rheumatism is admitted. It is possibly also related to tuberculosis. I have seen a typically megrinous girl, with high radial tension, carried off by rapid phthisis.

PART IV.

TREATMENT OF HEADACHE.

CHAPTER I.

GENERAL REMARKS.

WE have seen that the proper understanding of headache involves wide considerations, embracing, it would scarcely be too much to say, the entire field of medicine. Wherefore, to expound adequately the treatment of headache would be, practically, to write a work on the treatment of disease in general; and indeed I might end here without seriously jeopardising the completeness of this work, for the treatment of headache (as it has been my chief object to set forth) is the treatment of its causes—of eye-strain, nasal disease, anæmia, syphilis, uric-acidæmia, and the rest.

I have nevertheless thought it best to indicate the main lines of treatment in any given case, leaving the details to be filled up by the reader from his own knowledge of medicine and by reference to special works.

Our first object is to diagnose the case correctly—to find out the pathogenesis. If the patient is suffering from high fever the nature of the headache is at once obvious, but it is rather for chronic headaches that we are consulted, and it is essentially these which test our skill.

When the patient comes before us, we of course take note of age, sex, family, and past personal history, and make a careful investigation as to his present mode of life. Thus, we inquire how much sleep is taken and when, whether it is sound, and what is its effect on the headache; also of posture; what the quantity and nature of the daily exercise taken, and its influence on the head-pain; and if the digestive system is suspected, inquiry should be made as to diet. We further

look for sources of mental irritation, such as violent or depressing emotions and intellectual strain.

We then proceed to a personal examination, and it is convenient to seek for causes of peripheral irritation first: thus, we examine the sensory peripheries, beginning with the head and travelling downwards.

The scalp is carefully explored for evidence of syphilis, pediculi, etc. If the patient is a woman, any undue traction of the hair should be noted. If the glands receiving the lymphatics of the scalp are enlarged, we have a strong indication of some irritation of the scalp. The presence of alopecia, or abnormal greyness, should also be noted.

The eyes are next subjected to a searching examination. With the exception of chronic glaucoma, organic disease of the eyes is not likely to be a cause of chronic headache. It is to errors of refraction and to the erratic action of the extrinsic muscles of the eyes that we must chiefly direct our attention. We should inquire how much the patient reads, what kind of type, and under what circumstances—whether, for instance, in the train, in bed, or in a bad light.

The auditory apparatus has now to be examined. So obtrusive a disease as purulent otitis can never escape notice, but slighter defects, such as impacted cerumen and diminished pressure in the mid-ear, are not infrequently unrecognised causes of headache and other abnormal cephalic sensations.

The nasal cavities and post-nasal space must next be explored; such potent causes of headache as polypi, swelling of the mucous membrane covering the inferior turbinate, and post-nasal growths, may thus be revealed.

The pharyngeal space and buccal cavity now come in for examination. The presence of dental caries, overcrowding or impaction of the teeth—notably of the wisdom teeth—and any disease of the gums, should be noted.

Continuing our investigation downwards, we inquire into the condition of the digestive organs. We question carefully as to the time and character of the meals, and particularly in regard to the quantity of meat and of alcohol taken; and we especially seek for evidence of dyspepsia, to this end

inquiring whether the headache is worse after food, and whether there is constipation.

After the digestive system the condition of the reproductive organs may be investigated. Everything pertaining to the menstrual function is of the utmost importance to us. Is there dysmenorrhœa, or irregularity in the duration and in the intervals of the flux? and is there any connection in point of time between the headaches and the flux? The possibility of intra-pelvic organic disease must not be overlooked.

By this time we shall have investigated the chief sources of peripheral irritation likely to cause headache, but not all possible sources, for it must be remembered that every part of the body provided with nerves is a possible source of reflex irritation. Thus, such an apparently irrelevant matter as the wearing of tight boots may share in the causation of headache.¹

Having satisfied ourselves as to the presence or absence of peripheral irritation we may next inquire into the more general causes of headache. The condition of the blood and of the vascular system here engages our attention. Is there anæmia? because if there is, even if it does not initiate a headache, it is sure to aggravate it. Clinically, we may make three main varieties of anæmia. In the first (chlorosis), the patient is, speaking generally, fat, and in the other two thin. The first of these two latter varieties we may call the anæmia of simple starvation. It is very common in the poorer classes, being induced by overwork, worry, improper diet, and insanitary surroundings. The second is the anæmia of organic disease—of phthisis, malignant disease, Addison's disease, leucocythæmia, etc. Chlorosis, and the anæmia of simple starvation we can generally cure; in the latter variety we have much less success.

The arterial system must be subjected to a stringent

¹ I have given disorders of the digestive and reproductive systems among the reflex causes of headache, but I do not thereby wish to imply that they only cause headache reflexly. Dyspepsia without doubt induces headache by poisoning the blood, and in regard to the causal relation between menstruation and headache, we should be taking a far too narrow view if we regarded the affections of the head occurring in connection with menstruation as mere reflex effects of visceral irritation.

examination. The degree of prominence and tortuosity of the temporals should be noted; also, if one temporal is more prominent or more tortuous than its fellow. The existence of this latter condition may indicate a unilateral cause. The radial artery and pulse should be carefully examined; above all, an accurate estimate of the arterial tension should be made. Too much stress cannot be laid upon this investigation: it may be the clue to right treatment.

The condition of the kidneys and urine may next demand attention. If the patient is over thirty the urine should be examined as a matter of course. In all cases of periodic headache the quantity of uric acid excreted just before, during, and just after the attack, should be estimated, and we should always seek for evidence of uric-acidæmia. (This may be necessary in headaches other than the periodic.)

Finally, we should always be alive to the possibility of the patient being gouty, rheumatic, syphilitic, or the subject of ague.

CHAPTER II.

EXERCISE.

IN the treatment of headache it is necessary to make careful inquiry respecting the functional activity of the muscular system. Whatever tends to produce muscular fatigue or strain should be avoided, and we should endeavour to prescribe a course of muscular exercise suitable to the needs of the patient.

Exercise is useful in all forms of functional nervous disorders. Man is by nature adapted to an active life in the open air. During hundreds of generations he was a hunter; then he led a pastoral life, wandering hither and thither with his flocks; next he turned to agriculture, still keeping out in the open, and not till quite late in his evolutionary career did he settle down to a sedentary town life. Consequently, such a life is abnormal to him, enervating his body and rendering it prone to all kinds of nervous disorders. It is true that some people retain comparatively good health while leading a life almost devoid of exercise; thus, quite recently, we heard a certain public man boasting that he never takes any; but because a few individuals can remain comparatively well without it, it does not follow that all can, nor that those few would not enjoy better health if they took it freely. There can be little doubt that in the long run the health suffers from lack of it. Even if a person leading a sedentary life should live to be ninety, it would be no proof to the contrary, for who can say that if he had led an active life he would not have lived to be a hundred or more? And indeed, the very man who scoffed at the notion of exercise is himself a martyr to gout, and is thus a less perfect animal than if he had

no gout, from which probably he would be free, if he led a life of outdoor activity.

It is scarcely necessary to say that the more time those liable to headache can spend in outdoor exercise the better.¹ The exercise is useful not only as a preventive of headache but as a cure. Thus Latham observes that a walk or a ride may help to remove the pain of megrim; and he recommends the patient to move about or take exercise in the open air as soon as the pain has somewhat subsided, citing the case of a girl who obtained relief by taking a gallop on her pony during the subsidence of the attack.² Again, a writer in the *Practitioner* has known the worst case of megrim yield to "exercise pushed to the point of fatigue." The following extract from Dr. Smiles' book on "Life and Labour" deserves quotation in this connection:

"One wintry day a medical friend accompanied Dr. Field to the Archbishop's house at S——. The ground was covered with snow, and the thermometer was down to zero. As the couple of doctors passed, they saw an old labouring man felling a tree, while a heavy shower of sleet drifted pitilessly on his wrinkled face. One of them thought what a cruel master that man must have. The other said: "That labourer is none other than the Archbishop curing himself of a headache. When his Grace has been reading or writing more than ordinarily, and finds any pain or confusion about the cerebral organisation, he puts both to flight by rushing out with an axe and slashing away at some ponderous trunk. As soon as he finds himself in a profuse perspiration he gets into bed, wraps himself in Limerick blankets, falls into a sound slumber, and gets up buoyant."³

This is not the place to set forth in detail how muscular exercise benefits. Special mention may, however, be made of its influence on the respirations; these are quickened and deepened, and, as a result, the aspiratory action of the thorax is increased, and the flow of blood into the right heart thereby accelerated, while at the same time the pulmonary circulation is hurried on. In this way the blood-flow through the entire

¹ To lessen the frequency of megrim attacks, Little recommends the patient to take abundant exercise in the open air. Glatz recommends gymnastics and gentle exercise.

² *Brit. Med. Jour.*, March 30, 1872, p. 337.

³ See *Med. Press and Circular*, 1888, vol. ii., p. 224.

body, including the head, is greatly influenced by the respirations, and their effect on the lymphatic circulation is scarcely less pronounced. This explains why singing and public speaking are healthful exercises, those who indulge freely in either of them generally enjoying good health, while at the same time it is probable that exercise of the body at large is less urgently needed in their case than with others.

Those who do not use their lungs much may derive great benefit by taking forty or fifty deep breaths every morning and evening, and there are other similar exercises which will readily suggest themselves to the physician as useful adjuncts to the circulatory forces.

CHAPTER III.

TREATMENT DIRECTED TO THE REMOVAL OF CAUSES OPERATING THROUGH THE MIND.

Emotional Influences.—Those who are of a highly emotional temperament should be educated with a view of keeping the emotional side of their nature in abeyance, since much may be done in this direction by judicious training. Parents should make a careful study of the dispositions of their children from their earliest years, and if a child is found to be of an excitable temperament, every care should be taken to repress the tendency. It should go to bed early, should not be taken to theatres or any kind of show likely to excite unduly, and when sent to school (where there is as a rule less risk of excitement than at home), a hint of his disposition should be given to his teachers, so that the school influence shall work in line with the home influence. As adult life is approached, his parents should inform him of his temperament as far as they have been able to discover it—a task requiring, it need scarcely be said, much tact. Perhaps some will assert that the individual is the best judge of his own disposition, but a little reflection will show that an intelligent parent must know more of his child's character than the child itself; and whereas if left to himself an individual may take many years to find out his own leading traits—may not realise, for instance, till he is considerably over thirty, that he is of a highly excitable temperament—his nervous system will, if by his parent's aid he has been brought up to this knowledge and has been taught to guard against dangerous tendencies, be saved many a rude shock and years of needless wear and tear; for excitement, especially that form of it which I have spoken of as “sup-

pressed," is very wearing to the nervous system, and the same remarks apply to worry, which is another form of excitement. No mental influence has such a disastrous effect on the nervous system as worry, a fact which the alienist is never tired of emphasising. The subject of it should learn from early years to cultivate the mental habit of banishing worrying thoughts. What good does worry do? In the initial stage it may serve a useful purpose in prompting to fit action, but beyond this stage it becomes not only useless and redundant, but positively harmful, for it tends to paralyse action, while at the same time it inflicts pain which yields no compensating good.

Seeing what fruitful sources of headache excitement and worry are, I hold it most important to adopt every means to fight against them, especially as the headache resulting from them is one of the most injurious forms.

In endeavouring to combat a highly emotional tendency by effort of will, it is well to remember that, if the expression of any particular emotion be assumed, that emotion tends to be called forth. Let any one imitate the movements expressive of anger, and he is sure to experience something of the emotion itself; and similarly in respect of other emotions, such as grief or love. Now the emotional are generally very quick in their actions: they are ceaselessly expending energy, always on the go; they are apt to hurry over things—their very speech is rapid, and perhaps no less emphatic. This energy of movement is the expression of the emotional temperament, and tends, according to the principle just enunciated, to maintain the emotional effervescence. On the other hand, the unemotional, the phlegmatic, are much less apt to expend energy; they are slow and deliberate in their movements, and the characteristic displays itself in their speech. This muscular inertness is the expression of the unemotionality, and in its turn tends to sustain it. Hence, the highly emotional will do well to take a leaf out of the book of the phlegmatic—to go about their work deliberately and composedly, to avoid hurry in everything, even in speech, and in this way they may hope to acquire something of the lymphatic temperament.

Intellectual Influences.—We have now to consider the treatment of headache from the point of view of intellectual

influences. I have already said that intellectual effort is *per se* rarely a source of headache. All the facts go to show that it is, on the contrary, conducive to health, both mental and physical, provided it be made under perfectly sanitary conditions—that there is no interference with proper bodily exercise, no eye-strain, and so forth.

When intellectual toil has ill-effects, it is rather by inducing emotional excitement than by its direct action on the nervous system. The truth of this is particularly well seen in cases of over-pressure at schools. A child is wrought up to a highly nervous state, so that he wanders at night and is continually repeating his lessons in his sleep; but this state of things is certainly not so much due to the intellectual effort as to the excitement attending upon improper teaching and other conditions. Let it be remembered that the intellect is always at work, and that a young child turned out in the fields for a day will probably do more intellectual exercise than in the same time at the school in which there is “over-pressure,” every perception being an intellectual act, involving as it does the three fundamental aspects of mind—simulation, dissimulation, and retentiveness.

And here let me express my strong disapproval of any forcing whatever in education, and above all in the very young. (When adult life is approached, the mind will bear without injury a strain which cannot be put upon it in younger years with impunity.) The only sound method of education is to draw out the mind; it is a process of directing—I had almost said of humouring—rather than of driving. Never let it be forgotten that the mind largely tends to *evolve of itself*, and that all forcing, all strain, is hurtful. I believe that an individual may reach a fair level of mental evolution with far less teaching than is generally supposed.¹

¹ And here I am alluding, not so much to the teaching of facts as to teaching the individual how to learn, which, I take it, is the essential object of the professional teacher. It is certain that the mentally gifted require only the barest direction, so responsive are they: in their case the plant seems to grow unaided, securing its own food. We may be certain that this was how it was with such men as Shakespeare and Newton, of the latter of whom it is said that before the age of ten years he had actually worked out most of the problems of Euclid. But while many will admit this, they will urge that the

Bearing, then, well in view the fact that the mind tends largely to evolve of itself, we must be careful not to send a child to school too early. I do not think it should ever be sent before six years old, and I am sure that many should not be sent before they are eight. The increased receptivity of the mind then will more than make up for the loss of time; so that if we take two children of equal ability, and put the one to school at six and the other at eight, we shall probably not find the one more advanced at fourteen than the other at the same age.

The question of taking a child suffering from headache away from school occasionally arises. If the child has not been sent too early, and if the school is a good one, we shall seldom find

argument in no way applies to the generality of people, who can only be taught by dint of strenuous effort. And yet I believe it does largely apply to them. Admitting that the schoolmaster's function is primarily to teach how to learn, I think we shall find that more advance is made in this direction by humouring than by driving, and furthermore that he comes to the end of his tether far sooner than is generally thought: in other words, that the natural limitation to the pupil's powers of reasoning and learning is soon reached. The good reasoner and the good learner are, like the poet, essentially born, not made. Some instruction is of course necessary to the proper development of the intellect, but while this is readily absorbed by the well-endowed, there are others who, at whatever expense of time and pains, can never be taught to be good reasoners. The truth of this is well borne out by members of our own profession. We know there are some men—men even who have highly distinguished themselves at examination—who can never acquire distinction as diagnosticians; while there are others who without anything like the same amount of training naturally excel in diagnosis. Six months will show whether an individual has or has not the capacity of becoming a good clinician; and we find that one man is better able to diagnose heart disease after working for three months at the subject under an intelligent master than another after the same number of years.

"But," it may be argued, "what an enormous difference there is between the educated and uneducated! Take thirty of the most distinguished judges on the British Bench; it is practically certain that the same number of uneducated, or comparatively uneducated, working men, could be found in this country with the same average mental potentiality, yet the contrast between the two thirties would be enormous." I think it most probable, however, that if we were able to come into intellectual contact with the uneducated thirty, we should be much surprised to find how small after all the contrast is. If they were totally uneducated, we must assume that all the circumstances in their case tended to prevent evolution; but with a moderately favourable environment, I venture to think that there would not be such a great difference between the two sets in actual intellectual power as one might assume. In regard to *learning* there would of course be the widest difference, but we must not confuse scholarship with intellectual power.

this necessary. The headache in such a case will probably depend upon some physical error—*e.g.*, optic defect—rather than upon mental strain. The routine and healthy discipline of school life are usually much better for the child than home life, with its indulgences and its irregularities, and I believe we often make a great mistake in withdrawing children from school on the ground that they are delicate. In my experience children improve in health when they are sent to a well-regulated school.

CHAPTER IV.

TREATMENT OF EXTRA-CRANIAL CAUSES.

DISEASE of the extra-cranial structures causing headache may necessitate surgical interference. Thus, sebaceous cysts or other growths may, under the pressure of the hat, cause pain and require removal. Incisions of the scalp were once frequently resorted to for the removal of inveterate headache, and were even performed so late as Tissot's time;¹ and Mettauer has within comparatively recent times recorded a case of "neuralgia of the occipito-frontal muscle" which was cured by a large subcutaneous crucial incision.²

The management of the hair should have attention. This may strike some as a trivial matter, unworthy our consideration. I hold, however, that nothing is too trivial for the physician, and that success is not rarely due to attention to apparently insignificant details.³

We are often exercised as to the advisability of cutting the hair short in headache. This should always be done in *pediculi capitis* occurring among the poor and in the severer zymotic fevers. In the latter case, not only does the practice tend to keep the head cool, but it enables us to apply local treatment more effectually than we otherwise could. Neurasthenic

¹ See Copland's "Dict. of Pract. Med.," Lond. 1844, vol. ii., p. 155.

² Ziemssen's "Encyc.," vol. xi., p. 141.

³ I was much struck, on looking through the volumes of a Dental Society by the discussion which a paper on "Dentifrices," read before one of its meetings, had provoked. The subject was held to be too trivial to be discussed by a learned body, and its introduction called forth a stout protest from several members present. But surely the means of keeping the teeth perfectly clean is a very important matter, and should not be treated with disdain by any one who makes the care of teeth his life-work!

women with tender scalps often complain, especially at the time of the climacteric, of the weight of the hair, and cut it short of their own accord. They may safely be left to follow their inclination ; all we should insist on is that very long hair be cut moderately short.

The mode of wearing the hair in women affected with headache is a matter of no little importance. Our aim should be twofold : first, to reduce to a minimum the traction of each individual hair, and secondly, to ensure free ventilation of the scalp. Undue traction may arise from excessive weight of the hair, and from tightening the hair by pins or otherwise, according to fashion ; imperfect ventilation, from using pads and other artificial adjuncts, from gathering the hair into a small compass, such as a knot or coil closely applied to the head, and from plastering the hair down by means of grease.

By wearing the hair perfectly loose both these evils are avoided, and the best way is to wear it down the back, either plaited or free ; if plaited, care must be taken not to begin the plaiting too soon. If worn up, a loose knot resting at the back of the neck is best.

Brushing the hair is often very soothing to those suffering from headache. Not only is the nervous system directly influenced in this way, but the circulation in the scalp and other extra-cranial structures is accelerated, and it is not impossible that this also has a beneficial influence, seeing that some headaches may be due, in part at least, to the condition of these structures, as, *e.g.*, congestion and effusion. Brushing the hair in such cases may act as a species of massage ; and, indeed, in the so-called “rheumatic” headache, Nostroem recommends massage of the cranial muscles. If massage is applied directly to the scalp, the rubbing should be in the direction of the venous and lymphatic currents—*i.e.*, from above downwards. Sometimes the scalp is too tender to allow of direct contact.

CHAPTER V.

TREATMENT OF OPHTHALMIC HEADACHE.

SEEING that errors in accommodation and fixation constitute an important cause of headache, we should in all cases of chronic headache make a careful examination of the eyes. For an adequate treatment of this subject the reader must consult special works. Here I shall confine myself to the enunciation of a few simple rules.

a. Errors of accommodation.—These may depend upon functional defect in the ciliary muscle, or upon some error in the refraction of the eye, which may be either too long (myopia), too short (hypermetropia), or of unequal refractive power in different meridians (astigmatism).

Before proceeding to test, listen carefully to the patient's own account of his sight. He may say he can read and do near work, but that he is unable to see at a distance: here we suspect myopia. Or it may be that distant objects appear clear, while sustained vision for near objects causes discomfort, more particularly towards evening, when, if he reads, the letters become blurred and run into one another: here we suspect hypermetropia. If he complains that both near and distant objects are indistinct, then he is either suffering from a marked degree of astigmatism, or from some organic defect in the media, retina, or visual path. It is also useful to note the conformation of the face, head, and eyes. A long antero-posterior diameter with prominent eyes often goes along with myopia; a short one, with ill-developed eyes, with hypermetropia; while it is said that asymmetry of the face is frequently associated with astigmatism.

In testing the case for ourselves, we may exclude organic

disease if vision is improved by holding before the eye a diaphragm having a small aperture in its centre corresponding to the centre of the pupil. We next place the patient before Snellen's test types at a distance of 6 metres (=20 feet), and examine each eye separately. Suppose the patient is able to read the line marked 6, we say his vision = $\frac{6}{6}$, and he must be either emmetropic or hypermetropic; certainly not myopic or astigmatic. If on placing a +1D in front of the eye he is unable to read $\frac{6}{6}$, he is probably emmetropic, but he may be hypermetropic with spasm of accommodation, and in that case the spasm may sometimes be made to relax partially by keeping the + lens in front of the eye for some time, so that he shall at length be able to read $\frac{6}{6}$. If the patient is able to read $\frac{6}{6}$ with a + lens, he has hypermetropia, and the highest convex lens with which he can do so indicates the amount.

Suppose the patient is only able to decipher the letters as far as the line marked 24, we say his vision = $\frac{6}{24}$. He may then be either myopic or astigmatic, or he may have spasm of accommodation. If on trying a weak concave lens an improvement takes place, and if by gradually increasing its strength we can ultimately bring his vision up to $\frac{6}{6}$, he has myopia, and the weakest concave glass giving this result indicates its amount. When, however, concave lenses do not improve vision, astigmatism is suggested, and if in such a case we find the patient on attempting to read the distant type does not, as in myopia or hypermetropia, come to a dead stop after a certain line, but perhaps reads the subsequent line, though incorrectly, arriving at the result chiefly by guess-work; or if he tilts the head to one side; or if by placing a cylindrical lens in the trial frame, and rotating it in various directions, we hit upon one which gives him improved vision, then our suspicion of the presence of astigmatism is confirmed. Astigmatism is also indicated if in a fan of radiatory lines certain of them appear more distinct than others.

The method of estimating refraction by retinoscopy is at once the most ready and the most precise. Accommodation must first be paralysed. For young children a solution of

atropine (4 grs. to the ounce) should be instilled into the eye twice daily for a week; for adults a single application of homatropine will usually suffice. If the patient is over forty, it is generally best to dispense with a mydriatic, lest glaucoma be induced. The patient is placed on a chair in a darkened room, with a light, preferably over his head, so arranged that none of its rays fall upon his face. In this country a concave mirror with a focus of not less than 25 cm. is used, and the results I shall now describe have reference to this form of mirror. The examiner places himself four feet in front of the patient, and as far as possible so disposes his head that his features correspond to the patient's. He then holds the mirror in front of the eye he is about to examine, and illuminates its fundus. If the mirror be now rotated on one of its axes, a shadow will be observed to move across the area of the pupils. In general terms it may be said that the brighter the illumination, the sharper the edge of the shadow, and the quicker its movement, the less the ametropia; while the fainter the illumination, the less sharply defined the edge, and the slower the movement, the greater the ametropia. We examine the horizontal meridian of the eye by rotating the mirror on its vertical axis, and the vertical meridian by rotating it on its horizontal axis. If on rotating the mirror on the former axis the shadow moves with it, the horizontal meridian is myopic. We now place a weak concave lens in the trial frame and continue to increase its strength until we succeed in reversing the shadow, and the weakest concave lens that gives a definite reversed shadow is the correction of the myopia. (We then proceed to examine similarly the vertical meridian.)

Suppose, however, that the shadow, instead of moving with, moves against, the mirror, the corresponding meridian may be either emmetropic, hypermetropic, or slightly myopic. If the shadow moves with the mirror on placing a $+5D$ in the trial frame, the meridian under observation is myopic to the extent of not more than $1D$. If, on substituting a $+1D$ for the $+5D$, the shadow still moves with the mirror, the meridian is emmetropic; but if it moves against it, it is most certainly hypermetropic, and the strongest convex lens which just succeeds in

reversing the shadow indicates the degree of hypermetropia. If atropine has been used, 1D should be deducted for this glass, and if homatropine, .5D.

Headache due to error in accommodation may sometimes be relieved by instilling atropine into the eyes.

b. Errors of fixation.—The most common error of fixation is inefficiency of the internal recti (relative or absolute), so that during the convergence necessary for looking at near objects they readily become fatigued. Great adducting power of the interni ($= 30^{\circ}$ or 40°) is consistent with such inefficiency, for it may be due to the preponderating action of the externi. Maddox' test should be applied, and if there is then found to be latent divergence for distance, or latent divergence of more than a metre angle at $\frac{1}{4}$ metre, inefficiency of the interni is indicated. In treating these cases means should be adopted to improve the tone of the ocular muscles by tonics, outdoor exercises, and so forth, and the patient should be put through a series of properly regulated exercises in convergence. If these means fail, it may be necessary to employ weak prisms with the apex out, or decentred glasses, so as to diminish the effort of convergence; but, as a rule, they should only be used temporarily. Finally, tenotomy may be resorted to, so as to establish the proper equilibration between the several muscles of fixation. This treatment, greatly in vogue in America, has not found much favour in this country.

Inefficiency of the externi is less common than the above, and indeed is ignored by most English and Continental writers. If on applying Maddox's test we discover latent convergence for distance or for $\frac{1}{4}$ metre, the externi must unduly contract when the eyes are looking at distant objects in order to prevent double vision, but unless the latent convergence is very marked it is doubtful whether it causes fatigue. In regard to treatment, we endeavour to improve the tone of the feeble muscles by tonics, etc.; we put the patient through a series of exercises in divergence by employing prisms with the apex out, the patient then attempting to fuse. It is practically never necessary to employ prisms or decentred glasses for the purpose of diminishing the effort of divergence, and tenotomy is rarely justifiable.

In regard to inefficiency of the superior and inferior recti and of the oblique muscles, I shall say nothing. It is possible that they may take part in the causation of headache, but at present this is all that can be affirmed.¹

In treating cases of eye-strain it is very necessary to pay attention to the general health of the patient (see p. 73), seeing that the vigour of the ocular muscles rises and falls with that of the body at large. Nothing better shows the truth of this than the fact that eye-strain may often be cured by treatment directed to the general condition of the patient, without any local treatment whatever. It is also needful to bear in mind that abnormal states of the alimentary tract may predispose to eye-strain, which may thus sometimes be relieved by mercurials and similar remedies.

In all cases of headache in which there is defect of accommodation or fixation, we should as far as possible limit the use of the eyes for close work, until such time as we can correct that defect by the aid of lenses and other means. A very effective way of securing complete rest for the ocular muscles is by paralysing accommodation with atropine.

¹ For a more detailed description of the various errors in fixation, the method of detection and treatment, the reader is referred to Dr. Ernest Clarke's admirable work on "Eye-strain," Lond. 1892, part iii.

CHAPTER VI.

TREATMENT OF HEADACHE DUE TO NASAL, POST-NASAL, AND PHARYNGEAL DISEASE.

ANY disease of the nose and its accessory cavities may cause headache ; hence, in all cases of chronic headache these structures should be carefully examined, and disease of them treated. Into the diagnosis and treatment of nasal, post-nasal, and pharyngeal disease it is obviously impracticable to enter here fully, but a few points may be touched upon.

For reasons already given, nasal obstruction, from whatever causes arising, should receive careful attention. When it is present in only a small degree, the patient is often unaware of its existence. We must not therefore be content with his assurance that no such obstruction exists, but examine for ourselves ; nor must we be satisfied with the mere ability of the patient to breathe through the nose ; he should be able to do this freely and without effort. When the obstruction is pronounced, the physiognomy is characteristic. The mouth is kept open, the expression is vacant, and if the condition dates from childhood the nose is ill developed—apt to be low in the bridge while the nares are small. The most common causes of obstruction are swelling of the erectile tissue covering the inferior turbinate bone and adjacent parts, deflections of the septum, and polypi. It is probable, however, that the latter are very largely secondary to nasal obstruction, and the same remark applies to adenoid vegetations (post-nasal growths), though both of them still further increase the obstruction which has induced them.

When the atmosphere is cold and dry the erectile tissue over the inferior turbinate and adjacent parts undergoes physiological

swelling, so as to heat the inspired air to the temperature of the blood and to saturate it with moisture (Macdonald). It also swells up in nasal catarrh so as to obliterate completely the inferior meatus; and in individuals with chronic catarrh it may remain obliterated for months together. Examination discloses a smooth, dark-coloured, globular mass which pits on pressure with the probe, and rapidly shrinks on the application of cocaine. In this condition the inferior meatus should be syringed twice daily with an alkaline solution, to which either carbolic acid or benzoic acid may be added. If decided improvement does not follow this treatment, the swollen tissue should be touched here and there with the actual cautery, so as to pin the membrane down on the underlying bone after the fashion of the buttons of a cushion; or chromic acid may be applied.

If the swelling persist for some time, it is apt to go on to hypertrophy. The hypertrophied tissue then usually presents a pale and finely lobulated appearance, while the application of cocaine produces no visible shrinkage. In these cases it should be removed by means of a snare.

Deflection of the septum does not necessarily cause secondary mischief, even though complete obstruction of one nasal passage is produced; nevertheless, in some cases it may be troublesome and call for operative treatment.

Polypi and adenoid vegetations should always be removed. It is true that the latter tend to disappear at puberty, but meanwhile they are fraught with all sorts of evil consequences, not the least of which is the "aproxia" of which Guye has given so graphic an account. Other prominent symptoms are deafness (accompanied by depression of the membrana tympani) and snoring. The diagnosis is confirmed by digital examination.

Enchondroses, exostoses, etc., of the septum, and enlarged tonsils may have to be removed.

Although disease in any part of the nasal cavities may cause headache, it is probable that some regions are more irritable and more likely to induce headache when irritated than others. In our endeavour to discover the area of irritation, we may employ Scheinmann's method of applying cocaine to various

portions of the nasal mucous membrane in succession, and noticing the effects. In this way we may find one particular area more responsive to its influence than the others.

In the headache of acute coryza we should first cocaineise the inferior turbinate, and then use a stimulating spray. Subsequently, a snuff containing sulphate of morphia and sulphate of atropine may be employed.¹

It should be borne in mind that treatment directed to the nose is not always unattended by ill-effects, and should therefore be adopted with extreme caution. The mere washing out the nose may induce headache; acute iritis has followed the use of the cautery, and manifold neuroses may result from the treatment of nasal disease. Even Graves' disease is said to have been produced in this way.

Stimulation of the Schneiderian membrane by such agents as smelling salts frequently proves of service in headache. This method of treatment was largely adopted by the ancients, and indeed the employment of *sternutatories* and *errhines* has only been abandoned within quite recent times.² Thus the Greeks employed pepper, castor, elaterium, and soapwort as snuffs, and as injections they used the juice of elaterium mixed with milk and the juice of leeks. "Aretæus mentions in his chapter on the treatment of headache, a syringe with two delivery pipes made expressly for the nostrils. He also blew powder up the nostrils through a reed or quill, and applied ointments and liniments within the nostrils by means of a feather."³

Tobacco-snuff is sometimes helpful in headache by its reflex effect on the aching structures. The brain itself may be influenced in a similar way, habitual snuff-takers often resorting to a pinch for the purpose of stimulating the thinking powers.

Dupuy recommends the injection of carbonic acid gas against the nasal mucous membrane in megrim. This induces sharp occipital pain, but according to him seldom fails to afford relief in a few minutes.

¹ See article by R. W. Seiss in *Med. News*, Jan. 5, 1889, p. 10.

² See on this subject, Ziem, *Allgemein. Med. General Zeitung*. Nos. 35, 36, 1886; O. Laurent, *Ann. des Mal. de l'Oreille*, vol. xvi., p. 439.

³ See Laycock, *Med. Times and Gazette*, 1865, vol. i., p. 463.

CHAPTER VII.

TREATMENT DIRECTED TO THE EARS : TINNITUS.

IN all cases of chronic headache, examination of the ears should be a routine practice, and if we habitually resort to it, we shall not infrequently discover a morbid condition when we least expect it, and which, if it is not the sole cause of the headache, may at any rate be one among others.

The most frequent morbid condition is the presence of hardened cerumen in the external meatus. This may not only cause pain in the head, but other distressing sensations, notably that of weight. The mass is best removed by means of a syringe, the water being at a temperature of 100 F.; if it is very hard, the patient should be directed to pour into the meatus a warm alkaline solution (ten grains of bicarbonate of soda to the ounce of water) for two or three nights in succession, when the mass will come away more easily. The syringe should not be used too forcibly, otherwise inflammation, or even rupture of the drum membrane, may result, in addition to the discomfort to the patient. After the removal of the wax, cotton wool should be placed in the meatus. It is necessary to remember that the prolonged impaction of cerumen may have caused damage to the membrana tympani, and consequently its removal may not leave the ear entirely sound.

The external meatus may in a similar way be plugged by epithelial scales. These also may be removed by means of an alkaline solution.

Next as to the condition of the drum and tympanum. The normal drum is pearly white and translucent, so that the handle of the malleus may be seen through it, running downwards and backwards. When inflamed it is red. When

the air in the tympanum is exhausted from blocking of the Eustachian tube, the membrane is concave, opaque, and yellowish or bluish grey, the short process of the malleus being prominent. When, on the other hand, the tympanum is full of exudation and tension is great, the drum bulges, especially in its posterior inferior segment; in some cases exudation through the middle ear may be seen through the drum. Finally, the drum may be perforated.

So much for appearances. Next as to hearing. If this varies from time to time, there is almost certainly a blocking of the Eustachian tube, and in such cases the drum will be found greatly depressed. If the patient can hear best in a noise, the trouble arises from undue fixation of the small bones of the tympanum. If he can hear the tuning-fork in the affected ear when placed on the cranium, it is due to obstruction in the external or mid ear, and not to affection of the nerve. In such cases the sound is actually heard better with the deaf ear than with the other, just as, if one ear be stopped up artificially, the tuning-fork placed in contact with the cranium will be best heard in that ear.

Into the treatment of diseases of the ear it is impossible to enter at length. Whenever there is evidence of the Eustachian tube being blocked, we should endeavour to clear the passage, not only to establish the proper tympanic pressure, defect in which is a not infrequent cause of abnormal sensations in the head, but to permit free drainage from that cavity. The Eustachian tube is freed either by means of the Politzer bag or the catheter; but it is often necessary to treat the throat in these cases, as the blockage generally arises from disease there. Thus, not only may inflammation spread from the throat along the Eustachian tube, but the tube may be blocked by post-nasal growths, and sometimes by enlargement of the tubal tonsils; in these cases the post-nasal growths will require removal. The faucial tonsils should also be amputated if enlarged, this operation frequently leading to a diminution of the remaining lymphatic overgrowth, possibly by relieving lymphatic congestion, since the lymphatics of the pharynx and faucial tonsils freely communicate.

It need scarcely be said that all cases of otorrhoea call for

local treatment. There is a common opinion among the laity that a discharge from the ears serves a good purpose in children, that time will cure it, and that it is therefore best left alone—a belief that leads to disastrous consequences. The teeth of children suffering from otorrhœa should always be examined.

The best means of coping with earache, after we have as far as possible removed the cause, is by instilling sulphate of morphia (one grain to an ounce of water) into the ear. This is a very useful remedy in children. Warm water poured into the ear may also afford relief.

It is important to remember that acute inflammation of the tympanum may lead to symptoms like meningitis. In infants who are unable to indicate the seat of the pain, these may lead us into making a wrong diagnosis. They rapidly subside after free drainage of the tympanum is secured by puncturing the membrana tympani and inflating the tube. Calomel should be given, and it may be advisable to apply leeches.

Treatment of Tinnitus.—If with tinnitus there is evidence of gout, syphilis, chronic alcoholism, anæmia, or digestive derangement, treatment must be primarily directed to that, but the ear itself also must be carefully examined, and any disease of it treated. Sometimes counter-irritation in the neighbourhood of the ear does good—*e.g.*, repeated small blisters over the mastoid process. Some success has been obtained by causing the patient to listen to sounds opposite in character to those he hears (Bar). With regard to drugs, large doses of quinine and of salicylate of soda probably do most good; in some cases injections of pilocarpine have proved beneficial. It is best to begin by injecting $\frac{1}{16}$ of a grain and gradually to increase the strength to $\frac{1}{4}$ grain, persevering in the treatment for a long time. Other drugs which have been employed with success are chloride of ammonium, citrate of caffein, ergot, digitalis, and the zinc salts. Electricity is sometimes of signal service.¹ In the plethoric, bleeding will give relief.

¹ See p. 368.

CHAPTER VIII.

TREATMENT OF ODONTALGIA AND DENTAL HEADACHE.

IN our search after the causation of headache we must never neglect to make careful examination of the mouth and teeth. This should be done according to the directions already given. If any faulty condition of the teeth exists, the patient will sooner or later have to place himself in the hands of a dental surgeon, but meanwhile much good may be done provisionally, both in dental headache and toothache, by the physician. We have seen that headache may be of dental origin, even though no pain is felt in the teeth, and in such cases we may relieve, or actually remove it, by applying sedatives to the source of irritation—to a carious cavity, for instance. In other cases toothache may accompany the headache, and if in these we can cure the former, we shall generally succeed in curing the latter also. It is therefore advisable to set forth briefly the best means, short of operative measures, of curing toothache and dental headache occurring independently of toothache.

First, as to internal treatment in toothache. If the pain can be traced to acidity, give bicarbonate of potash. It is probably chiefly when there is acidity that rinsing the mouth with an alkali—a plan especially efficacious in pregnant women—is beneficial. A brisk saline purge, particularly if dental periostitis be present, sometimes relieves the pain. When there is no inflammation, a large dose of quinine (15–30 grains) acts well; and sulphide of calcium (2 grains), compound soap pill (5 grains), and calomel (3–5 grains) appear to be very serviceable in dental periostitis.

Next, in regard to local treatment. This consists in treating the affected tooth (or teeth) and the gums. Except for the

skilled dentist, the former practically resolves itself into applying sedatives to a cavity. This should be first syringed with tepid water, and then thoroughly dried with pellets of cotton wool.¹ Having done this, the following applications may be employed, after which the cavity may be packed with wool partially moistened with mastig, care being taken to press lightly, and not in the direction of the cavity :

(1)	Acid. carbol. (sat. sol.)	} ana ̄j.
	Chloral hydrat. (sat. sol.)	
	Tinct. camph. co.	
	Ext. aconit. fluid (U.S. Phar.)	
	Ol. menth. pp.	̄ss.

(2)	Chloral hydrat.	̄j.
	Aquæ	̄ss.

Misce et adde :

Tinct. aconit. (Fleming)	℥xv.
Chloroformi	} ana ℥xx.
Ætheris	
Sp. vin. rect.	

(3)	Liq. opii sed.	} ana ̄ij.
	Ol. caryophyll.	
	Camphor	̄iss.

(4)	Acid. carbol. (crystals)	} ana.
	Collodion ²	

(5) Apply 1 per cent. sol. of nitro-glycerine ℥j-ij, and afterwards laudanum on cotton wool.

(6) Introduce a few grains of solid hydrate of chloral into cavity of tooth, where it rapidly dissolves. Repeat the operation a second or third time if necessary.

¹ Decayed dentine is said to act as an irritant, and some dentists recommend that it should be removed before the sedatives are applied. According to Turner, the general practitioner may safely undertake the task of removing sufficient for the immediate purpose. All that is required is a small mouth-glass and a few excavators with round or spoon-shaped cutting edges. It is only necessary to remove the very soft dentine. (See *Brit. Jour. of Dent. Science*, vol. xviii., p. 549.)

² James Bate recommends, after applying the above on a dossil of cotton wool, to seal the cavity thus : dip another portion of wool into a solution of gum sandarach, then wash it in cold water for a minute, when it can be rolled into a ball and moulded (*Brit. Jour. of Dent. Sci.*, vol. xix., p. 242.)

- (7) Apply cotton wool dipped in solution of sulphate of atropia (not more than $\frac{1}{4}$ grain at a time). Should not be done more than once in the twenty-four hours unless the patient is under constant observation.
- (8) Apply carbolised resin on pledget of wool; may then seal with wax; instruct patient to exchange plug for fresh one if pain not gone within a quarter of an hour.¹

So much for toothache, and even though no toothache is present, it may be advisable, if a dental cavity exists, to treat it with one of the above applications, seeing that headache may arise from dental irritation. Lauder Brunton tells of a case in which immediate relief was obtained in this way.² It should never be forgotten that a dental cavity affords an admirable opportunity of attacking the fifth nerve directly, and it does not seem altogether unlikely that some headaches are immediately relieved by applying sedatives to a carious tooth because the nerve is thus reached, and not because they are in any wise due to dental irritation. Even though treatment directed to several cavities in succession should afford relief in the case of one particular tooth only, the headache need not be dental, inasmuch as the nerve of this tooth might be more exposed than those of the others, and therefore more likely to be influenced by a local application.

Tincture of capsicum, tincture of iodine (double strength), or tincture of aconite may be applied to the gum. Such treatment is said to be capable of checking a dental periostitis in its early stage. Cotton wool dipped in hot water and placed, as hot as can be borne, between the gum and the tooth, is also of service when there is inflammation.

¹ Thos. Fletcher speaks well of the above treatment; before applying the wool he advises that the cavity should be gently cleared without excavation. (*Brit. Jour. of Dent. Sci.*, vol. xxii., p. 552).

² "Disorders of Digestion," Lond. 1886. p. 100.

CHAPTER IX.

TREATMENT OF HEADACHE ASSOCIATED WITH HIGH ARTERIAL TENSION.

IF arterial tension is high in a patient suffering from headache, we must endeavour to lower it. I cannot do better than summarise Sir W. Broadbent's observations on the method of reducing high arterial tension. The diet should be sparingly nitrogenous: meat should be taken only once a day, and even fowl and game with great moderation, since they contain more nitrogen than is generally supposed. (It may even be necessary to withhold all meat, red and white.) Alcohol should be taken sparingly. The patient should drink little with the meals, but on going to bed and on rising he may with advantage take one or two tumblerfuls of hot water, this aiding the elimination of effete matters, the circulation of which in the blood is possibly the chief cause of habitual high tension. The patient should every now and then go through a three weeks' course of Carlsbad salts, or sulphate or phosphate of soda, one to two drachms to be taken in a copious draught of hot water every morning while dressing. To this the succus taraxaci may be added, or a weak infusion of taraxacum may be employed as a vehicle. This saline treatment may be combined with a mild mercurial course, the patient taking, say, a grain of pil. hydrarg. three times a day, in conjunction with colocynth, rhubarb, or ipecacuanha. Broadbent also speaks highly of the liquor potassæ and the carbonate of potash in these cases. The Turkish bath is often useful.

It is possible that the habitual high-tension pulse so carefully investigated by Broadbent is in large measure due to uric-acidæmia. Be this as it may, it is certain that uric-acidæmia,

of which high arterial tension is very characteristic, is frequently associated with headache, and therefore the treatment of it is a matter of considerable importance to us. The plan adopted by Broadbent for reducing high arterial tension is also useful in relieving uric-acidæmia. Haig, to whom we are greatly indebted for our knowledge of this condition, cuts down the nitrogenous input as far as practicable, and endeavours to promote the elimination of the uric acid by alkalies, but, above all, by salicylate of soda, giving occasionally such drugs as opium and acids which temporarily free the blood of uric acid by driving it into the tissues—a subject I have gone into under the head of “Drugs.” While he lays great stress upon curtailing the nitrogenous input, he cautions us to beware how we do this in persons in whom we have reason to suspect a considerable storage of uric acid in the tissues, as “in a man of middle age, or beyond it, who has lived heartily, without stinting himself in either meat or wine;” meat not only increasing the uric acid production, but lowering the alkalinity of the blood, and tending to keep it free of uric acid by driving it into the tissues. Now, if from such an individual as the above we suddenly withhold meat diet, there will be a rise in the alkalinity of the blood, and for weeks or months it will be flooded with uric acid. During this time the headache, irritability, etc., will be actually increased instead of diminished, and seeing no immediate good resulting, he will probably throw up the treatment in disgust. In all such cases Haig advises that we should clear out the uric acid accumulations by a course of salicylates before altering the diet, which should be done during a cold part of the year—autumn or winter. In such cases the diet should be altered gradually, and the plan I have successfully adopted is to prohibit meat one or two days a week, according to circumstances, next to withhold it on alternate days, and then gradually to limit still further the quantity taken, finally, if need be, withholding it altogether.

Inasmuch as uric-acidæmia is a fundamental factor in the causation of megrim, the treatment of this latter largely resolves itself into the treatment of uric-acidæmia. Haig speaks enthusiastically of the good effects he has obtained in megrim

by restricting the nitrogenous input, and he believes that not only this but many other disorders might be prevented by adopting a diet exclusively, or almost exclusively, vegetarian. I can fully confirm his observations regarding the necessity of cutting down the nitrogenous diet in megrim.

We have seen that uric-acidæmia may also cause non-megrimous headache. In all cases of chronic headache, therefore, we should be on the look-out for uric-acidæmia. I have seen many such headaches cured simply by limiting the quantity of meat taken.

The beneficial effects on headache of spare diet, temperance, and copious draughts of water have long been known, though perhaps it has not been recognised that they are chiefly of advantage in headache associated with uric-acidæmia and high arterial tension. Thus, Fordyce, in his "Essay on Hemicrania,"¹ writes: "Ut in aliis cruciatibus ita et in hoc victus ratio tenuis conducit . . . Caena præsertim semper frugalis sit et simplex ne humores minus cocti et perspirati cerebrum gravent." Willis recommended, for the prevention of headaches, "to use at times whey or spaw waters; also drinking of water, or a thin and cooling diet help; the shunning of wine," etc.² Fernelius recommended for certain headaches draughts *aqua pluvia*.³ Again, we read in Hoffmann: "Another physician, after purging with Seidlitz waters, ordered a pint of cold water to be drunk in bed every morning and afternoon" (evening?),⁴ and according to Labarraque,⁵ Haller cured himself of his headache by drinking water and by taking a light diet. He also refers to the case of Marmontel, who for seven years had suffered from headache, and who, after consulting the Queen's physician without success, cured himself by following the advice of a veterinary surgeon, which was—to drink water,⁶ eat little, and take plenty of exercise. More recently Alexander Wallace has added his

¹ "Hist. Feb. Mil. et de Hemicrania, Dissertatio," 1758, p. 96.

² Willis's "Practice of Physick," Lond. 1684, p. 115.

³ J. Fernelii Ambiani, "Universa Medicina," 1656, Lib. v. cap. i.

⁴ "A System of the Pract. of Medicine," by F. Hoffmann, trans. by W. Lewis, Lond. 1783, vol. i., p. 473. ⁵ *Essai sur la Céphalalgie*, Paris, 1837, p. 66.

⁶ "When your ink is too thick, and will not flow, what do you do?" asked this very practical man of healing. To which he made answer: "Put water into it." See article on "Megrim," by Leonard Guthrie, *Lancet*, 1893, vol. i., p. 193.

testimony to the good effects obtained by copious draughts of water in preventing and aborting attacks of megrim.¹ Another writer has recommended “Une grande sobriété et abstention complète de alcooliques.”

But while many headaches are a result of eating too much, notably of meat, others may be caused or intensified by eating too little. Some megrinous patients, as Anstie observes, keep themselves in a half-starved state, in the belief that various articles of diet disagree with them.² Especially are they afraid to take fat, believing it to cause biliousness. Thus they tend to become thin and bloodless, and the victims of severe neuralgia. True megrim is not so common among such as simple neuralgia, but it may undoubtedly occur. It occurs alike among the poor suffering from chronic starvation, and among the well-to-do living temperately. How far the megrim is in these cases connected with uric-acidæmia, I cannot say. One would not expect this latter condition to play a prominent part in their causation; nevertheless, in treating them I think it advisable to keep down the proportion of nitrogenous food taken, for it is probable that cases of this kind would be aggravated by an excess of uric acid in the blood, even though they may not have been caused by such excess. On the other hand, the diet should contain a large proportion of fat, in the shape of butter, Devonshire cream, etc. Cod-liver oil may also be given. In extreme cases it may be advisable to resort to the Weir Mitchell treatment, but if we do we should administer salicylate of soda so as to prevent an undue accumulation of uric acid in the body.

¹ *Lancet*, 1893, vol. i., p. 80.

² *Practitioner*, Dec. 1872, pp. 352, 353.

CHAPTER X.

TREATMENT DIRECTED TO THE ORGANS OF DIGESTION.

IN the treatment of headache the digestive organs may require attention. On this subject I can only allow myself a few general remarks. We must not fall into the error of supposing that indigestion, whether gastric or intestinal, is necessarily recognised as such by the sufferer: it is possible for an individual to have very decided indigestion without being aware of the fact. We have, in short, to bear in mind that various grades of efficiency obtain in the operations of the organic world, and that, starting at the level of ideal digestion we descend through many gradations from the ideal before reaching the level of definite indigestion, and further still before we arrive at such decided indigestion as shall reveal itself unmistakably to the patient.

Ideal digestion seldom occurs among those who are compelled to lead confined lives, and therefore it is rare among town-dwellers, especially after youth is passed, though the charge of having indigestion would often be indignantly repelled. It is, however, certain that in this class the complex processes of digestion are not habitually so vigorously and effectively carried on as after three or four weeks of a well-spent holiday, when the appetite is keen and the digestive juices, we may assume, correspondingly active. Thus we may find a hard-worked, gouty town-dweller, who, though not complaining of definite indigestion, habitually eats more than is under the circumstances good for him, eating much more—perhaps twice as much—during his holiday, and feeling the better for it, and this though he may be taking no more than his accustomed bodily exercise. Such cases are, I imagine, to

be explained, in large measure, on the assumption that in consequence of a more normal environment than usual, digestion is carried on more perfectly during the holiday than at other times—that the digestive products which are poured into the circulation then tend to approach the ideal in composition, containing a maximum of easily assimilable material and a minimum of poisons ; so that, in spite of an actual increase in the amount of food taken and no additional exercise, the individual is not so overfed as he was before, the larger quantity of food with the more perfect digestion being less productive of gout than the smaller quantity of food with the less perfect digestion.

Two facts seem to follow from the above considerations : first, that an individual may suffer from headache due to some imperfection in digestion, all the while believing his digestion to be sound ; secondly, that chronic indigestion—of acute indigestion I say nothing—should not be treated as a mere local disorder. If we bear in mind that the vigour of digestion rises and falls with that of the body at large, we shall realise how important it is not to regard and to treat indigestion as a purely local affair. Drugs which act locally upon the alimentary tract play a very subsidiary part in the treatment of chronic dyspepsia ; in the acute variety they do more good, but we shall rarely cure a case of the former by specifics, any more than we shall a case of chronic bronchitis. How can we expect to compel the digestive glands to carry on their subtle functions aright by the mere administration of this, that, or the other drug ? It is on the great healing power of Nature that we must rely. If we look upon disease as a natural variation, as a departure from the normal type, and if we remember that the organism after all such departures tends, when placed in its normal environment, to revert to the normal, we shall realise that the physician's great aim in the treatment of chronic disease should be to secure that environment for his patient : in other words, to give Nature a chance of working her own cure.

CHAPTER XI.

TREATMENT DIRECTED TO THE REPRODUCTIVE SYSTEM.

WHEN headache in women is connected with organic disease of the internal genitalia, attention should of course be directed to the latter; the difficulty is to be certain that such a connection exists. No such difficulty presents itself in regard to the menstrual headache, which is clearly, in some way or other, related to the menstrual process. Headaches of this kind have the advantage that they may be attacked in advance. The days immediately preceding the epoch should be spent as much as possible out of doors, especial care being taken to keep the bowels well open, while drugs having a direct influence on the head-pain, such as cannabis indica, salicylate of soda, and the bromides, may be given. On the eve of the epoch, or at its commencement, we may order a mixture containing chloride of ammonium, tincture of belladonna, and liquor ammoniæ acetatis. The temptation to lounge about during the flux is often very great, but except in special cases should not be yielded to; more good will generally come from a good brisk walk—advice, by the way, which applies as much to dysmenorrhœa as to menstrual headache. An exception must, however, be made in the case of genuine megrim, which often requires complete rest.

In headache associated with menstrual suppression, effort should be made to re-establish the flux. Graves in an article on "Headache of Young Women,"¹ recommends that in such cases the times at which the molimina occur should be noted, and treatment begun a few days before their appearance. He applied two leeches on the inner side of the thigh, near

¹ See the *Dublin Jour. of Med. and Chem. Science*, May 1, 1833, pp. 153, 156.

the labium, on three alternate nights, giving aloetic pills on the intermediate days; hot footbaths containing mustard were ordered to be taken frequently, and the feet to be rubbed every morning with stimulating liniment, while turpentine and tincture of cantharides were given internally.

When headache occurs in connection with climacteric suppression, it is rarely advisable to attempt the induction of the flow, but when plethora is pronounced we should resort to free bleeding. Few headaches are more obstinate than those which occur at the climacteric. They should be treated on general principles. The bromides appear to be especially useful in these headaches, and may often, especially in the plethoric, be advantageously combined with rhubarb and gentian. Ergot and turpentine are also frequently of service. Almost all climacteric patients—even the plethoric—are benefited by tonics. Presbyopia should be treated, though unfortunately we shall sometimes find glasses of little avail. Above all, let the patient take abundant out-door exercise.

The headache which so frequently makes its appearance at puberty is much more amenable to treatment. All exciting causes should be removed, and we should raise the bodily vigour to the highest possible level by gymnastics, swimming and other exercises.

CHAPTER XII.

TREATMENT OF SYPHILITIC AND GOUTY HEADACHE.

THE treatment of syphilitic headache is the treatment of syphilis, a subject on which it is unnecessary to dwell at length here ; all I would emphasise is the necessity of being alive to the possibility of a headache being syphilitic, not only because we may otherwise fail to relieve the patient, but—what is yet more important—because this variety of headache is so frequently the precursor of some more serious syphilitic affection of the nervous system. Sometimes, indeed, the warning comes too late, as in one of my patients who almost immediately after the headache developed was attacked with cerebral thrombosis, and slowly drifted into imbecility ending in death. Generally, however, ample time is given us to attack the disease effectually.

In the treatment of syphilis it is most important not to trust too implicitly to drugs. Seeing that the ravages of this fell disease are in direct proportion to the physical feebleness of its victim, our aim should be to raise the general health to the highest possible level. It must be further borne in mind that the syphilitic poison has itself a very debilitating effect upon the body, as may be observed both in the secondary and tertiary stages of the disease. I have already said (see p. 199) that the headache which Fournier describes as characteristic of the secondary stage in women, differs in no wise from that which attends general debility—that it is the neurasthenic headache. Similarly, in the tertiary stage we often find the patient in a very broken state of health. In all such cases we must be as careful to restore the bodily vigour (by attending to diet, administering tonics, and so forth,) as to

prescribe mercury and the iodide; otherwise we may find we are making no headway against the disease. In one case of headache accompanying the tertiary stage, I prescribed the iodide for months, but without avail, and this, though every effort was made to improve the patient's general condition by the administration of cod-liver oil, tonics, etc. Finally, she was admitted into hospital, when she rapidly improved; this result being evidently due to the rest in bed, regular, suitable diet, and all the accessories of good nursing. I have little doubt that many cases of syphilis are best treated in bed.

It is important to know that mercury, as well as the iodide, is sometimes called for in the tertiary stage. Thus, Trousseau records the case of a woman with gumma in the cranium, who was affected with intense headache, especially at night, and who was greatly benefited by mercury, the iodide of potassium alone having done her no good.¹ The same physician gave $\frac{1}{6}$ grain of calomel every hour, for ten to twelve hours in succession, to relieve the nocturnal headache of syphilis. Peter, who speaks highly of this method, attributes the efficacy of such small doses to their rapid absorption.² The iodide, on the contrary, should be given in large doses. Some have given as much as 400 grains in the day. I believe that failure in treatment by the iodide is often due to the smallness of the dose given.

Macnaughton Jones relates two cases of syphilitic headache relieved by the subcutaneous injection of muriate of pilocarpine. Concerning the first he writes: "He finally passed on to complete optic atrophy. But I never remember seeing a man suffering from such violent cranial pain as this man. It was simply marvellous the relief afforded, almost instantaneously, from the injection subcutaneously of from $\frac{1}{5}$ to $\frac{1}{2}$ a grain of muriate of pilocarpine. I must have injected this man forty or fifty times without any bad effect, and he used to crave for the injection."³

Gouty Headache.—Here again the treatment of the headache is that of the condition underlying it—viz., gout. By gouty

¹ *Gaz. des. Hosp.*, Nov. 27, 1855.

² *Lancet*, 1875, vol. ii., p. 666.

³ *The Practitioner*, 1885, vol. i., p. 261.

headache I do not mean megrim, which, as we have seen, is very apt to occur in those who are the subjects of the gouty diathesis, but rather the headache which occurs in the gouty after middle life and independently of kidney disease. This headache usually yields to such remedies as colchicum, bicarbonate of potash, salicylate of soda, and calomel, while Spencer Wells and Symonds refer to the beneficial action of quinine.¹ For the detailed treatment of gout the reader is referred to the classic works of Garrod and Duckworth. I will merely say that from my own point of view the ideal treatment of gout appears very simple. It consists in placing the patient as far as possible in his natural environment, *i.e.*, in cutting off alcohol—or at least in restricting it to the distilled liquors, which should be taken freely diluted—in curtailing nitrogenous diet as far as practicable, and in insisting upon a proper amount of exercise. I am aware that this treatment is not a popular one with patients, who for the most part belong to the self-indulgent class, their gout being in fact the direct result of such indulgence, and I am willing to admit there are cases so advanced as to call for less rigorous measures. If a man has fatty heart, rigid arteries, and fibroid kidney, he is beyond cure, and the most we can do for him is to palliate his troubles. I am further willing to grant that it may be impracticable to enforce the above treatment even in those cases where we believe it to be the right one. Nevertheless, it appears to me that we should ever keep it before us as the ideal treatment, and congratulate ourselves in proportion as we are able to prevail upon our patients to adopt it.

In the light of recent biological knowledge it seems probable that gout is strictly an acquired disease. By this I do not mean to say that heredity plays no part in its causation, holding, as I do, that from one point of view every disease is hereditary; what I do mean is that no one would have gout if he lived in a normal environment, that he gets gout essentially because, possessed of a certain structure, he subjects himself to influences tending to produce it, and that the fact of his

¹ See *Med. Times and Gaz.*, 1858, vol. i., p. 496.

ancestors having been exposed to such influences probably in no wise increases his own liability to the disease.¹ It appears, in short, that certain individuals are so organised—whether their ancestors have or have not led gouty lives is a matter of indifference—that they are apt to develop gout if they subject themselves to certain influences, just as those endowed with a particular kind of scalp become bald if they wear tight-rimmed hats which strangle its nutrient vessels, not because their ancestors have worn such hats and the tendency to baldness has slowly evolved, but because they inherit a peculiarly constituted scalp.

Now if these observations are true—and I cannot doubt that they are in the main—if a man is himself responsible for his gout, if his mental self is the true pathogenic agent, surely the philosophy of our treatment is to make him mend his ways? On the current assumption that his gout is due more to the intemperance of his forefathers than to his own, a plea might with some show of force be put forward for more indulgent treatment than that I here recommend, but with the alternative assumption such a plea falls to the ground, and the difficulty that remains is to decide whether the case is so far advanced along the road of degeneration that it is inadvisable to adopt the treatment in its full rigour. I can only say that I believe the ultimate effect of absolute teetotalism, aye, and of vegetarianism, on elderly men who have been heavy eaters and drinkers all their lives, would be much more beneficial than is generally supposed, so beneficial as to compensate them for their deprivations, in proof of which we have only to see how well men of this class do in hospital on purely

¹ These statements are not in accord with the view I advanced in the "Causation of Disease." In that work I assumed, in common, I may say, with the profession generally, that acquired characters are freely inherited. Weismann has, however, done much to shake our old faith in this principle, and we may now assert with some degree of certainty that, even should it eventually be shown that such characters are inheritable, they are not inherited to the extent formerly supposed. Pathologists do not yet seem to have grasped the importance of this conclusion. Note, for instance, how it modifies current views of the pathogenesis of gout.

I have discussed the question of the inheritability of acquired characters in my work on "The Differences in the Nervous Organisation of Man and Woman," London, 1891.

milk diet. Many, however, will consider a cure of this kind worse than the disease, and I am bound to say that the physician has to be somewhat of an opportunist in his practice, and while pointing out the best way, to be content very often if his patient will take the second best.

CHAPTER XIII.

SLEEP IN ITS RELATION TO THE TREATMENT OF HEADACHE.

SLEEP in those subject to headache must be carefully regulated. "Early to bed, and early to rise" should be the motto. We may also often help our patients greatly by correcting some error in the arrangement of the meals. The last meal should not be taken for at least three hours before going to bed—very trite advice, it may be thought, but none the less very sound. It is a good plan to take a short walk just before retiring. Care must be taken that the bedroom is well-ventilated. The habit of reading in bed is bad, for not only may it interfere with sleep by the mental excitement which it is apt to induce, but it may cause trouble by the local irritation of the eyes themselves, especially if there is any defect in accommodation or fixation. It may certainly be a factor in the production of morning headache.

It is important that the head be well raised at night and the pillow hard; "for if it be soft, the head sinks into it and becomes hot, which with some people is enough to provoke an attack of headache in the morning, if the sleep have been long and heavy." Ross relates a case tending to show that a hard pillow may be beneficial in headache. "When I was a boy, an old servant in the family suffered from severe periodical headache, which prevented her from sleeping, and which, so far as I can remember, had all the characters of true megrim. Her remedy was to place a stone flag on her pillow, and by resting her head on it the combined hardness and coldness of the stone seemed to enable her to sleep, and next morning she awoke without headache."¹

¹ *Op. cit.*, vol. i., p. 705.

It is said that morning headache may sometimes be cured by sleeping with both arms high above the head, the good effect being wrought by modification of the cerebral circulation. "I may mention," writes Mitchell Henry, "in order to show that this position of the arms, though unpleasant, is by no means unbearable, that I am acquainted with the case of a young lady who for two years slept with the hands and arms thus raised."¹ This treatment is, however, not likely to find much favour, the morning bath and cup of tea affording a more agreeable, and generally a more effective, means of dealing with this headache.

Symonds insists that in "hyperæmic headache" the head and shoulders should be raised, and the patient prevented from slipping down in the bed by reversing the inclination of that part of it where the pelvis rests; and he maintains that a morning headache may often be prevented in this way.²

The quantity of sleep should be regulated by circumstances. As a rule, the katabolic—the active and restless—require more than the anabolic—the phlegmatic. It is beyond question that we can often benefit our patients by prescribing extra sleep, just as, on the other hand, we may sometimes do good by curtailing the amount; for, as the ancients well knew, too much sleep may induce headache.

It is generally bad, if one wakes some time—say one or two hours—before the usual time of getting up, to spend the interval in dozes, nor is it wise to jump suddenly out of bed.

¹ *Lancet*, 1859, vol. ii., 581.

² *Med. Times and Gaz.* 1858, vol. i., p. 471.

CHAPTER XIV.

HOT AND COLD APPLICATIONS — COUNTER-IRRITATION — DRY CUPPING — LOCAL ANODYNES — ELECTRICITY — BLEEDING — PRESSURE APPLIED TO THE HEAD — COMPRESSION OF CEPHALIC VESSELS—TREPHINING.

SINCE the earliest days of medicine local applications have occupied an important place in the treatment of headache. These measures of relief consist in the application to the head of extreme heat and cold, through such media as very hot water, and ice; in strong counter-irritation, as by blisters, the actual cautery and setons, or milder counter-irritation, as by dry cupping, stimulating liniments, and plasters; in soothing applications, such as anodynes, lotions, electricity; in bleeding by means of leeches, arteriotomy, or phlebotomy; in applying pressure to the head and cephalic vessels; and, finally, in the operation of trephining.

Hot and Cold Applications to the Head.—It has long been known that headache may be relieved by applying something cold to the head. Thus Celsus wrote: "Nothing is so beneficial to the head as cold water."¹ Galen applied snow; Avenzoar recommended that water should be poured upon the head from a height; while Alsaharavius and others employed bladders of oil that had been cooled in snow,² a practice which reminds us of the modern one of applying ice to the head in a gutta-percha bag. Willis wrote: "It hath been beneficial to many to pour cold water every morning and evening on the

¹ See "W. F. P." (*Lancet*, 1887, vol. i., p. 454), who points out that Sir Robert Christison in his autobiography recommends this treatment, citing the case of his own mother as an instance of its beneficial action.

² Paulus Ægineta, *op. cit.*, pp. 353, 354.

temples, forehead, and forepart of the head: yea, to wash or pump the whole head, every morning with cold water, or at least to dip it into a bucket or pit of water.”¹

Arnott adopted a method known as *congelation*, by which he claimed that 50 per cent. of headaches may be cured immediately, and most of the remainder alleviated;² and A. H. Hamilton speaks of freezing the skin just in front of the ear.³ Child recommends that ice be applied to the head in violent bilious headache,⁴ and the common practice of bathing the head with eau de Cologne and other cooling lotions sufficiently attests the relief it affords.

One would naturally expect cold applications to be most efficacious where there is an undue tendency to hyperæmia of the head; for instance, in that variety of megrim in which there is marked pulsation of the carotids with tense temporals, and a tendency to chilliness of the trunks and limbs. In fact, the rational treatment of such cases appears to be to apply cold to the head and heat to the rest of the body, especially to the feet, and this is what Latham actually recommends. He applies cloths dipped in cold water to the head, and if the extremities are cold, he employs a warm, stimulating foot-bath.⁵ Handfield Jones recommends similar treatment in “hyperæmic headache”—viz., cold douche to the head, a “hot or sinapised pediluvium, repeated dry cupping, suitable aperients and sedatives.”⁶ Anstie, to cut short an attack of megrim, directed the patient to plunge his feet into hot mustard and water, and to inhale the rising steam.⁷ Day advises a warm bath when the feet are cold, adding that astonishing relief may be obtained in this way. The effect of these several treatments is to reduce the arterial pressure, both in the head and the rest of the body, while

¹ English trans., *op. cit.*, p. 118. Stuckens (“De Dolore Capitis,” Brux. 1787) also recommends cold affusion in headache.

² The directions he gives are as follows: Place powdered ice, salt, and a little sal-ammoniac and nitre in a silk gauze net, and apply it to the painful part. The brine, as it comes away, should be absorbed by a sponge or flannel. If a bladder is used, the mixture must be stronger (“On the Remedial Agency of a Local Anæsthetic,” etc., J. Arnott, Lond. 1851.)

³ *Phil. Med. Times*, 1874-5, p. 290.

⁴ Ranking's Abstracts, vol. v., p. 38.

⁵ *Brit. Med. Jour.*, March 30, 1872.

⁶ “Functional Nerv. Diseases,” p. 422.

⁷ *Practitioner*, Dec. 1872, p. 350.

the result of applying cold to the head is to diminish the flow of blood to it.

While some recommend cold, others advise hot applications to the head. Kent Spender regards the application to the head of water as hot as can be borne a remedy of great service in megrim; and another writer advises¹ this treatment in the headache of eruptive fevers, influenza, and whooping-cough.²

Trousseau highly commended the application of great heat to the head. He employed a calico bag filled with sand heated to 45° C., or even 50 C.° This was applied for half an hour three or four times a day.³

There are others, again, who contend that heat should be applied to the head in some cases, cold in others.⁴ Thus, Fordyce⁵ observes: "Contraries are cured by contraries; if, therefore, the pain is excited by heat, the head should be bathed with cold water; but if cold is the cause of the complaint let it be bathed in hot sea-water, or enveloped in hot cloths."

According to my own experience, the application of both heat and cold is beneficial in headache, and I know of no reliable rule to guide us in the choice of the one or the other. Neither am I aware of any ill-effects following from their employment, though Kent Spender thinks the application of cold to the head in megrim may be hurtful. Brunton suggests that the good effect of both heat and cold is obtained by similar action; he assumes that the pain in megrim is due to the irregular contraction of some cerebral vessel or vessels, and that therefore cold and heat do good by equalising the calibre of these.

The practice of taking cold baths is generally a very good one for those with weak nervous systems. Eustace Smith speaks highly of cold or tepid douches in combating the ten-

¹ *Brit. Med. Jour.*, 1884, vol. i., p. 1144.

² *Assoc. Med. Jour.*, Lond. 1854, p. 307.

³ *Gaz. des Hospitaux*, Nov. 27, 1855. Hoffmann declared that the best remedy in violent headaches and delirium was "a chicken or pigeon, killed and cut open, and applied warm to the shaved head" (*op. cit.* vol. i., p. 163).

⁴ See, for instance, Whytt, "Observations," etc., Edin. 1765, p. 516.

⁵ "De Hemicrania," Lond. 1758, p. 95.

dency to megrim. Those who are liable to megrim, however, are often very susceptible to cold; they are apt to suffer from cold hands and feet, and to become blue after a cold bath. Such subjects can never be habituated to a cold plunge. The same authority holds that when the weather is cold, weakly children should be placed in hot water while the douche (which should not be too cold) is applied, and the child afterwards rubbed down with a rough towel.¹

J. Chapman successfully treated headache and associated disorders by applying ice to the spine;² while C. J. Cleborne maintains that the application of cold or heat to the neck is more efficacious in headache than its direct application to the head or elsewhere. He fills a piece of intestine with iced or hot water, and applies it round the neck.³

Counter-Irritation.—Local treatment is found especially effectual in those cases in which pain is limited to one spot. Rhases, in obstinate cases of headache, recommended the actual cautery, and Homberg is reported to have cured a case of headache by setting the patient's hair on fire!⁴

Blisters and setons have been largely employed from the

¹ "Disease in Children," 1889, pp. 16, 316.

² *Med. Mirror*, Lond. 1869, pp. 160, 167.

³ *Med. Record*, 1871-2, p. 309.

⁴ See Vaughan, *op. cit.*, p. 69. This reminds me of a somewhat similar cure accidentally effected in his younger days by a physician now of some eminence. When first serving his term of apprenticeship, as was then the custom, a man presented himself at the surgery with severe lumbago. The young novice, rightly judging that the pains would be relieved by dry-cupping, forthwith proceeded to perform the operation—and for the first time in his life. Having poured the spirit into the cup, he set light to it, but as he neglected first to dry the rim the spirit caught fire both inside and outside, and while in full blaze he clapped the cup on to the bottom of the man's back which, as it happened, was remarkably hairy, the result being that a considerable area was soon denuded. The patient, however, went away quite satisfied, and about nine months later he came back with the same complaint and requested to be dry-cupped again, as the first operation had done him so much good. On this occasion another assistant happened to be in, and he performed the operation *secundum artem*. The patient was quite disgusted with this tame performance, averred "that that weren't the way the other young gent did it," and evidently considered that he had not received his money's worth! The good effects of the first operation were doubtless due to the smart counter-irritation unintentionally induced. I mention the story because it is an instructive one, and because it is not otherwise likely to be preserved.

time of Hippocrates downwards, and are mentioned by practically all the writers on headache. A common place to apply them was the back of the neck. Willis applied them here and behind the ears. "The ancients," he writes, "frequently administered plasters made of mustard, and such as raised wheals or welks over the parts, and it is a daily practice to apply, sometimes to all the hinder part of the head, vesicatories or blistering plasters, against most cruel headaches." Preparations of cantharides have also been employed from a very early date.¹

One objection to blistering is that it is apt to leave an unsightly mark; it may also, especially if the patient is reduced in health, cause a troublesome sore. Croton-oil liniment (one drachm of the oil to an ounce of tincture of camphor) is free from this objection, while if rubbed in sufficiently it produces a copious crop of pustules. Or we may apply a liniment made of one part of oil of mustard to four parts of alcohol, with little fear of blistering if we are cautious. Another method is to allow the vapour of carbon disulphide to play against a limited part of the scalp, as recommended by Kennion,² but this has objections, chief among them being the unpleasant odour of the gas. The same result may be obtained with less trouble by means of chloroform vapour.

Dry-cupping.—This remedy, which has gone a good deal out of fashion of late, has been successfully employed in headache by Graves, Murphy, Tanner, Sieveking, and others. It affords a convenient and not unpleasant method of counter-irritation, and I have several times seen it do good. Graves recommended the repeated application of dry-cups in the neighbourhood of the head—six to be fastened at once at the back of the neck between the shoulders and below the clavicles, and one or two smaller cups near the ears, the suction being sufficient to keep them on for ten minutes or a quarter of an hour. Murphy recommended that the spine and, if necessary, the whole of the back, should be smeared with spermaceti ointment, and the cupping-glass moved over the surface thus anointed.

¹ "Linimento e cantharidibus in Hemisrania utebatur jamdudum Archigenes; quod quidem mirum in modum prodest" (Fordyce, "De Hemisrania," Lond. 1778, p. 92.)

² *Med. Times and Gaz.*, 1868, vol. ii., p. 77.

Anodynes.—Instead of counter-irritation we may resort to anodynes, or we may combine the two. The following preparations may, according to circumstances, be employed for these purposes: (1) Liniment opii; (2) linimentum belladonnæ; (3) tincture of aconite and rose-water (one ounce of the former to seven of the latter—to be brushed in; or the aconite may be used in the form of the ointment); (4) one grain of atropia to an ounce of glycerine of starch; (5) one part of iodoform to twelve of collodion, to be applied repeatedly till a good thickness has been attained; (6) a drachm each of chloral, camphor, and chloroform, with half a drachm of morphia (brush on for anaesthesia); (7) twenty drops each of oil of cloves and cinnamon, with one drachm of menthol and one ounce of alcohol; (8) one ounce of tincture of belladonna, and ten drops each of tincture of aconite and chloroform.

Ointments may also be employed—*e.g.*, one composed of: (1) chloral and menthol, one part each, cocoanut butter, two parts, and spermaceti, four parts; or, (2) half a grain of sulphate of atropine, one and a half grains of aconitine, two drops of croton oil, with two ounces of petroleum ointment; or, (3) two grains of veratria to an ounce of lard.

Electricity.—Scribonius Largus recommended, among other cures for headache, the application of a live black torpedo, a remedy as old as the time of Galen.¹ “Is not this,” asks Adams,² “an application of the principle of galvanism in medicine?”

Both faradism and galvanism, but especially the latter, have been largely resorted to within recent years for the relief of various pains, headache among the rest. Coudret seems to have been one of the first to apply electricity in headache.³ A. H. Smith employed the mild faradic current. Hamilton found “rheumatic” headache very amenable to faradism applied for a few minutes, by means of the wire-brush.⁴ He also faradised the cervical sympathetic, a method which others have more recently recommended in megrim. Leslie Jones is enthu-

¹ Kühn's edit., vol. xii., p. 365.

² Paulus Ægineta, *op. cit.*, p. 359.

³ See Labarraque, *op. cit.*, p. 62. Pariset (“Dict. des Sci. Méd.,” Paris, 1813) recommends electricity in the treatment of headache.

⁴ *Phil. Med. Times*, 1874, p. 289.

siastic regarding the treatment of headache by electricity. "No one," he writes, "who has not tested for himself the value of electricity in various kinds of headache, can form even a proximate estimate of the relief that it constantly affords;"¹ and he refers especially to the amenability of megrim to the constant current. He places the sponges on the temples or the mastoid processes. Neftel also recommends galvanism in megrim.² He pronounces it to be "a sovereign remedy, not only during the intervals of the attacks, but during the attacks themselves." We may apply moderate currents daily, placing the negative pole on the nape of the neck and moving the positive pole slowly over the forehead, eyes, and face, with an occasional reversal of the current. If no improvement ensues, use a weak faradic current. Erb also recommends in headache the application of the "electric hand," that is to say, faradism applied to the head by means of the moistened hand, which thus constitutes an electrode.³

Any one who will carefully observe the effects of electricity in headache, will, I think, find in it a potent remedy. It has not received the praise due to it because seldom resorted to in temporary and occasional headaches, in which, however, it may be very useful. It is rather in the chronic and inveterate forms, which have resisted every other means of relief, that the physician tries it, and it is not surprising if in these it sometimes disappoints. Nevertheless, even in these it frequently affords at least temporary relief: I have seen the agonising pain of intra-cranial disease removed as if by a charm by the constant current, although the respite was unfortunately not of long duration.

Galvanism is very serviceable in neuralgic pains of the head. If the pain is limited to the track of a special nerve, say the supra-orbital, the positive pole may be placed at its root, and the negative over the distribution of the nerve. The current should be passed for from five to fifteen minutes whenever a paroxysm recurs or threatens.

Electricity has been employed with advantage in the treat-

¹ "Liverpool and Manch. Med. and Surg. Reports," 1876, p. 168.

² "Archiv für Psychiatric u. Nervenkrankheiten," Bd. xxi., pp. 133-144.

³ Ziemssen's "Encyc.," vol. xi., p. 144.

ment of tinnitus. The indifferent electrode, which is large, is placed on the back of the neck, and the exciting electrode over the external meatus; the current should first be weak, and then gradually increased in strength.

Bleeding.—In the cure of headaches, as of other disorders, bleeding is now far less resorted to than formerly. Almost every writer on headache I have consulted mentions it as a remedy. Galen had recourse to it in certain cases; Aurelianus recommended, in violent headache on one side, to bleed on the opposite; Celsus advised “*sanguinem ex naribus detrahere*” in obstinate headache; Haly Abbas, Alsaharavius, and Rhases, all bled in headache, and so on down to the beginning of this century. Four methods were adopted—arteriotomy, phlebotomy, cupping, leeching. The practice of opening an artery was beginning to fall out of use in the time of Willis, who writes that it was held in “great esteem among the ancients, and some of the moderns make use of it, and very much cry it up.” The temporal seems to have been the artery usually chosen; we are expressly informed that Rhases opened this vessel in headache. Galen, so far as I know, confined himself to the operation of phlebotomy, which came more and more into use as arteriotomy was discarded. Willis, for example, advocated opening a vein—“*phlebotomia sæpe convenit.*”¹ Arteriotomy, however, was employed in the treatment of headache as late as the time of Whytt.

Cupping was practised by the Arabian physicians; for instance, Alsaharavius applied cups to the nape of the neck in headache with plethora.

Leeches were, I believe, used by Aurelianus; also by Willis, Wepfer, Whytt, and many others.

Though during the advance of the present century bleeding for headache has fallen out of fashion, some spasmodic attempts have been made to revive the practice, its advocates in some cases suggesting it as though it were perfectly novel. Thus, in 1837, bleeding from the nostrils was recommended “as a new and efficacious remedy in headache.”² In 1863,³ Mayo describes cases of headache which were greatly benefited by

¹ “*De Anima Brutorum, Ceph. curatio,*” Lond. 1672, p. 196.

² *Brit. and Foreign Med. Review*, 1837. ³ *Brit. Med. Journ.*, June 6.

blood-letting, and he recommends it in those cases in which there is heaviness and fulness in the head with deficiency of bile and mental depression. Again, in 1880, J. Brown¹ advocated blood-letting in "headache with insomnia due to congestion of the brain," quoting successful cases; thus, in a woman, aged thirty, with headache increased by lying down and accompanied by insomnia and congestion of the eyes, he cured both the headache and sleeplessness by drawing off 15 ounces of blood, and subsequently an additional 5 ounces. Two other cases were cured in the same way.

I have no hesitation in recommending this treatment in plethoric patients where other means of relief have failed. There are, indeed, cases where no other treatment immediately avails, for though it is true that plethora may be relieved by purging, restricted diet, and active life, the relief is not immediate, and there are some patients who make blood so readily that the tendency to plethora seems to assert itself in spite of all these measures. It is in such cases that the more drastic method of bleeding should be resorted to.

Pressure applied to the Head.—Most headaches are alleviated by external pressure, and many sufferers instinctively resort to this method of obtaining relief, either pressing the hands firmly to the head, or bandaging it up after the manner of little Arthur, who reminds his would-be assassin that he "knit his handkerchief about his brow" when his head "did but ache."²

In applying pressure to the head in headache, we should endeavour to have it equally distributed, and this cannot be done by means of a handkerchief. A closely fitting capelline bandage serves the purpose admirably, and will sometimes afford very considerable relief, especially when the pain is of a throbbing character. Crombie has employed a closely fitting head-bandage made of Hooper's "spiral-elastic fabric." Such a bandage, as Crombie observes, is especially useful in the

¹ *Brit. Med. Jour.*, 1880, vol. i., p. 13.

² This quotation is more than once referred to in writings on headache; also another Shakespearian passage in which Desdemona says to Othello, who is suffering from headache: "'Tis with watching. Let me but bind it hard and 'twill away."

headaches which are rendered worse by coughing, and he asserts that "the painful sense of bursting and fulness which more or less accompanies headache of every kind, can be thereby greatly diminished."¹

Compression of Cephalic Vessels.—Compression of the carotids and temporals frequently relieves headache, as many writers, *e.g.*, Tanner,² Wilks,³ and Brunton,⁴ have insisted. Parry refers to the influence of pressure applied to the carotids,⁵ and Dechange has observations on the same subject.⁶ Mary obtained great benefit in twenty-four cases of hemicrania by compressing the carotid on the affected side. He employed for this purpose a truss which took its support from the back of the trunk, the pressure on the artery being exerted by means of a piece of cork. Guyon applied pressure on the temporal arteries in the violent headache of yellow fever. He learnt the plan from the native women of some country where the disease raged; they were in the habit of seeking relief by fixing half a lemon on each temple by means of a bandage passed several times round the head. His method was to employ "a semicircular band of steel, provided at each end with a pad resembling that of a hernia truss, which is movable, so that the compression need not always be on precisely the same spots"; enough space was left between the steel arch and the forehead to admit of cold applications. Liveing quotes Möllendorff⁷ to the effect that pressure on the carotid during a paroxysm of pain in megrim relieves it as if by magic, and Brunton suggests that the relief arises from the pressure removing the irregular arterial contraction on which he supposes the pain in megrim to depend.

There can be no doubt that a temporary relief from pain may often be obtained by carotid compression; but unfortunately it is frequently a respite only, partly no doubt because, as Wilks insists, the blood soon finds its way round by

¹ *Lancet*, 1873, vol. ii., p. 102.

² "Practice of Medicine," edited by Broadbent, 1875, vol. i., p. 441.

³ *Op. cit.*, p. 553.

⁴ "Disorders of Digestion," p. 103.

⁵ "Memoirs of the Medical Society of London," vol. iii., p. 89.

⁶ *Ann. Soc. de Méd. d'Anvers*, 1844, pp. 293-296.

⁷ *Op. cit.*, p. 309.

collateral routes. It is naturally greatest in those cases in which the face is flushed and there is marked pulsation of the carotids and temporals.¹ I have seen the best results from pressure on the temporals, either on one or both sides, according as the pain, or pulsation, or both, have been unilateral or bilateral.

Trephining.—This operation was practised for headache in the time of Willis. “There is yet another chirurgical operation,” he writes, “cry’d up by many for a pertinacious headach, but by none (that I know of) yet attempted, to wit, an opening of the skull, near the grieved place, with a trypaning iron. This, our most ingenious Harvey endeavoured to persuade a noble lady, labouring with a most grievous and inveterate headache, promising a cure from thence; but neither she, nor any other, would admit that administration.”²

The existence of worms was once supposed to be a source of inveterate headache, and trephining was recommended in such cases. Thus J. Baptist Morgagni writes: “But as they (the worms) chiefly inhabit the frontal sinus, which is indicated by the pain beginning, and being most troublesome, in the region of this sinus, especially when joined with a sense of motion and gnawing; Littre therefore judged it proper, that, if all other assistances failed, the aid of surgery should be called in, as an operation on the frontal bone was neither difficult nor dangerous. And I do not doubt but he meant to recommend the same operation which Cæsar Magatus formerly used, as I have heard from Vallisneri; that is, to trepan the bone quite into the sinus, and to take out the worm, which he had predicted was contained there, to the great admiration of the spectators; and thus he happily rid the patient of the pain, against which all other applications had been of no effect.” The author remarks upon the difficulty in the union of the bone, as mentioned by Cornelius Celsus.³ Later, we find Louis

¹ One writer contends that pressure on the carotid of the affected side increases this pain in the anæmic variety of megrim, but he does not say whether this is an *a priori* or an *a posteriori* conclusion. *The Virg. Med. Month*, Oct. 1881.

² Eng. transl., *op. cit.*, p. 119.

³ “The Seats and Causes of Diseases,” trans. by B. Alexander, Lond. 1769, vol. i., Letter i., p. 11.

Touret vaunting the operation of trephining in rebellious headache.¹

We have seen that persistent and intense headache may follow a blow upon the head. These cases have not, Victor Horsley thinks, received sufficient attention "though several surgeons have published instances during the last fifteen years." The pain in them is apparently due to some local organic change, presumably inflammatory in nature, set up by the injury. In such, the operation of trephining holds out good hopes of recovery, as will be seen by the following table abridged from Horsley :²

CASES OF HEADACHE TREATED BY TREPHINING.

	CAUSES ALLEGED.	SYMPTOMS AND DURATION OF ILLNESS.	PREVIOUS TREATMENT.	OPERATION.	RESULT.
M. 37		3 years' severe boring pain.	Narcotics.	Trephining, erosion of skull by Pacchionian bodies.	Complete cure. Patient later had a fresh pain, suspected to be due to a sharp corner of replaced bone. Incision and removal of the same gave final and complete relief.
F. 25	Sharp, heavy weight struck vertex. Small hæmorrhagic cyst at seat of injury, previously removed without relief.	3 years' intense pain at seat of injury. Insomnia.	Chloral, other narcotics (chloral habit).	Trephining and removal of bone which was very vascular.	Complete cure.
M. 38	Severe blow on head with hammer. Right-sided weakness. Right hemi-anæsthesia, fits, paralysis of the right 6th nerve.	10 years' great pain.	Narcotics.	Trephining. Brain bulged posteriorly.	Complete cure.
M. 31	Fall from horse, small cicatrix, optic atrophy.	15 years' severe pain. Markedly localised.	Iodide of pot., antipyrine, Indian hemp, &c.	Trephining. Apparently slight thickening of dura.	No return of pain.

Mayo Collier reports a case of headache in which trephining the frontal sinuses afforded relief. "For the last six years the patient had suffered from a more or less intense headache at

¹ "Dict. des Sci. Méd.," Paris, 1813, Art. "Céphalalgie." p. 427.

² See *Brit. Med. Jour.*, 1890, vol. ii. p. 1288, Table ii.

the root of the nose, augmented by damp and rainy weather. . . . On attempting to read with the head forward, or to paint, which was his favourite occupation, the annoyance of the pain was such as to force him to desist. . . . The pain was more annoying for its constant presence than for its intensity, but was sufficient to render his life miserable and unfit him for ordinary duties.”¹

¹ *The Medical Week*, Dec. 16, 1892.

CHAPTER XV.

DRUGS EMPLOYED IN THE TREATMENT OF HEADACHE.

Salicylate of Soda.—This substance is chiefly useful in the headache of uric-acidæmia, whether it take the shape of classical megrim or of simple headache occurring during the morning alkaline tide. Finkelstein and Devleizerskey were among the first to use it in megrim, the former giving it in small doses frequently repeated, the latter employing it in much larger quantities. Lauder Brunton recommends it also for rheumatic headache in two-and-a-half-grain doses every half-hour, either alone or in conjunction with aromatic spirits of ammonia. I have given reasons for concluding that soreness of the scalp is no indication of rheumatism; it may accompany headache of every description, and is exceedingly common without it, but whatever be its essential cause, salicylate of soda has often a very decided effect on it.

Haig in 1886 insisted upon the value of salicylate of soda in megrim, and to him belongs the credit of having given a rational explanation of its action in this and allied disorders. According to him, its value depends upon its power of entering into combination with uric acid, and of forming with it a soluble salicylurate which does not produce the same ill-effects upon the nervous system as the urates of sodium and potassium. We have therefore in salicylate of soda a drug which enables us to run an excess of uric acid out of the body in an innocuous compound. By giving it over long periods of time in gouty and allied states, we may hope to gradually draw upon and finally exhaust the stores of uric acid in the body, and thus to remove the more or less chronic uric-acidæmia, with its accompanying high tension and tendency to headache, &c., and this

without producing disagreeable symptoms. Similarly, by giving large doses for a short time we may attack a temporary uric-acidæmia, and thus remove megrim, simple headaches, and possibly other neuroses which may be excited by an excess of urate in the blood.

In administering the salicylate of soda, we must be careful to remember that it is most soluble in a slightly acid medium, least so in one that is highly alkaline: hence its efficacy in fever when the blood-alkalinity is generally low. When the alkalinity is high, the salicylate should be combined, or given alternately, with a drug which lowers alkalinity, as, for example, opium or compound spirits of ammonia; or a dose of opium or nitro-hydrochloric acid may be followed by the salicylate—a plan adopted with good result at the beginning of a sick-headache. If we desire to continue the salicylate for some time, we may alternate it with nitro-hydrochloric acid, varying the proportions according to circumstances, say, three days for each.

Another plan for running the uric acid out of the body when alkalinity is high, is to give phosphate of soda.

According to Brunton, the salicylate increases the secretion of bile, rendering it at the same time more watery, a result which Haig attributes to its influence on uric-acidæmia, during which the arterioles of the tissues generally, the liver among others, are constricted. Whatever removes uric-acidæmia tends, therefore, to relieve the arterial constriction, and to increase functional activity.

Salicylate of sodium may sometimes be combined very advantageously with citrate of caffeine; or if the patient is anæmic, with ammonio-citrate of iron. Five grains of the latter, with half a drachm of compound spirits of ammonia and twenty grains of salicylate of soda, may be given for weeks or months together.¹

¹ I can speak confidently of the value of the above mixture, not only in the headache of anæmia, but in the anæmia itself. Haig has pointed out the beneficial effect of salicylate of soda in anæmia, and that it enhances the action of iron in this disorder, facts with which I have been often struck. I have known a case of chlorosis which had all but entirely resisted the influence of iron for two years, suddenly yield to the salicylate, a course of which had been given for subacute rheumatism, which latter, if we accept Haig's

Chloride of Ammonium.—This salt is one of the most valuable in the Pharmacopœia, and but for its unpleasant taste would doubtless be far more extensively employed than it is. In 1859 Barrallier wrote a long article on its use, especially in headache, extolling its action in megrim, and observing that it is shown most strikingly when the pain is most intense. He also advised its use in the headache accompanying gastric disturbances and grave fevers.¹ As an anodyne in severe neuralgic pains about the head, it stands pre-eminent. It must be taken in large doses frequently repeated. The plan I adopt is to give half a drachm with seven-and-a-half drops of tincture of gelsemium in an ounce of camphor water, at intervals of an hour. If no benefit follows after the third dose, let the medicine be discontinued. Generally, however, a slight improvement is observed after the first, and it becomes more decided after the second and third. In such cases, it is well to discontinue the mixture after the third or fourth dose, and not to take it again till a paroxysm seems imminent. Meanwhile, the respite from pain enables us to attack the primal source of the trouble—to give abundant nourishment, cod-liver oil, iron, strychnine, and so forth. The effect of the ammonium chloride is, I believe, more lasting than that of other drugs, such as opium and antipyrine, and it has, moreover, no unpleasant after-effects. In very severe cases we may, however, add small doses of morphia, and perhaps a drop of tincture of aconite; counter-irritation may also be applied. In some instances it may be desirable to give salicylate of sodium or iodide of potassium with the chloride, all these salts going well together. I have frequently combined the salicylate and the chloride, with the best effect.

It is impossible altogether to mask the unpleasant taste of theory of rheumatism, was quite possibly the result of the prolonged course of iron. I take this opportunity of pointing out that I have also had considerable success with the above mixture in rheumatoid arthritis. If we add five grains of iodide of potassium and increase the salicylate, as occasion may require, to thirty or forty grains three times a day, and continue this treatment for some months, alternating it with a similar period of treatment by arsenic in ever-increasing doses (five to thirty drops of the liquor), we may obtain most satisfactory results in this obstinate malady.

¹ "Bull. Général de Ther.," Paris, 1859, vol. lvi., pp. 305-313.

the chloride, but syrup of orange flowers (one to two drachms), compound tincture of lavender (same dose), and glycerine, are somewhat helpful in this respect.

The Bromides.—Though the treatment of nervous disorders by bromides has of late years been overdone, there can be no doubt that, properly administered, they are of marked service, more especially where great nervous perturbability is present. It is a good plan to give the sodium, potassium, and ammonium bromides together.

Charcot held that cases of megrim which begin by visual disturbance, and which are accompanied by passing aphasia and numbness, or tingling of one side, should be treated by large doses of bromide of potassium. He began by giving thirty grains, three times a day, augmenting the dose by fifteen grains every week, so that in the fourth week the patient was taking seventy-five grains to the dose. He was then ordered to begin again at thirty grains, and to increase the dose in exactly the same way for another month, and so on for a whole year. In a case treated in this way, Charcot claimed to have eradicated the disorder.¹ As we should expect, the cases of megrim in which he recommends the treatment by bromides are of the epileptic type.

Iodide of Potassium.—Sieveking recommends iodide of potassium and guaiacum in so-called rheumatic headache. When great tenderness of the scalp is present, it may be given in conjunction with salicylate of soda. "I have found," writes George Haley, "as a rule, that a heavy dull headache situated over the brows, and accompanied by languor, chilliness, and a feeling of general discomfort, with distaste for food, which sometimes approaches to nausea, can be completely removed in about ten minutes by a two-grain dose of iodide of potassium, dissolved in half a wineglass of water, and this quietly sipped, the whole quantity being consumed in about ten minutes."² It is not improbable that the sipping plays, in these cases, some part in the result.

It is in syphilitic headache especially that iodide of potassium is called for; indeed, here its administration may make

¹ *Le Progrès Méd.*, June 11, 1887.

² *Australian Med Jour.*, Aug. 15, 1881.

all the difference between a practical cure and a terrible death. Hence, as we cannot always be certain that a patient suffering from organic brain-disease is syphilitic, we should, to avoid all risk, prescribe the iodide at the outset, in any case of headache accompanying organic disease of the brain. Hear what Moxon says on this head : " I would particularly impress this duty (viz., of prescribing iodide of potassium) upon you, and if I speak strongly, that is because there rise to my recollection the large number of persons I have already seen blind, squinting, palsied, agonised, or even dead, for want of iodide of potassium. If I were an examiner in medicine, I should ask a candidate : ' What would you do if a young adult came to you with signs of organic disease within the cranium ? ' and if he did not say he would at once give iodide of potassium, I would send him down three months to think it over. . . . Most of the persons with organic brain-disease that come before you, curable by iodide of potassium, not only deny syphilitic history, but show no trace of syphilitic disease of the skin and bones. . . . Acres of detail on the varieties of tumour-micrology become worse than frivolous beside an ignorance or a faulty grasp of this truth." ¹

The dose should be from fifteen to twenty grains of the salt, three times a day after meals, to begin with, and should steadily be increased. As many as four hundred grains have been given with good effect in the twenty-four hours.

Chloride of Sodium.—Common salt has been used successfully in megrim. The dose is a tablespoonful, followed by a draught of cold water, to be taken when the attack is impending. According to Haig, this substance has the same effect upon uric acid as an acid, driving it out of the blood into the tissues, a view which enables us to explain its use in megrim.

Ammonia and its Salts.—Ammonia is an old and valuable remedy in headache. Thus Willis prescribed, " Spirits of Hartshorn," and Whytt employed " volatile ammonium salt." Sal volatile is a common household remedy in headache. As we have seen, it may in some cases of headache be advantageously combined with salicylate of soda. Wright

¹ *Lancet*, 1875, vol. i., p. 750.

recommends the acetate of ammonium in the headache which follows upon a debauch.

Alkalies.—All the drugs hitherto considered are alkaline, but the effects we have dwelt upon are in a measure independent of their alkalinity. Apart, however, from these specific effects the sodium and potassium salts produce results directly attributable to their alkalinity: they raise the alkalinity of the blood, and diminish the acidity of the urine, rendering it indeed alkaline if given in sufficient quantities. By increasing the alkalinity of the blood they increase its capacity for holding uric acid in solution, and thus tend to favour the elimination of this substance by the kidneys. They may therefore be employed for this purpose, but the uric-acidæmia thus induced causes a number of disagreeable symptoms. It is, therefore, better to run the uric acid out of the body by means of salicylate of soda, which is less unpleasant in its effects. Sir William Roberts contends that the exhibition of soda salts favours the deposition of uric acid in the cartilages of the joints, and he recommends the administration of citrate of potash for the purpose of increasing the elimination of uric acid from the body. Brunton recommends bicarbonate of soda with bitters before meals “in frontal headache at the junction of the hairy scalp and forehead, or pain in the upper part of the forehead without constipation.”

Acids.—These are probably chiefly useful by virtue of their power to free the blood of uric acid; they are, therefore, especially indicated in the headache of uric-acidæmia. According to Haig, it matters little which acid is used, citric or hydrochloric being equally good. One plan in the treatment of uric-acid headache, when occurring in its paroxysmal form (migrain), is to give from forty to sixty drops of diluted nitro-hydrochloric acid in a wineglassful of water, one-half to be taken in half an hour; or if the urine is alkaline when the acid is first given, it may be necessary to give twenty drops more. If the headache is not cured by this treatment, then, according to Haig, it is not uric acid migrainous headache.¹ The administration of acids should not continue more than a

¹ *Brit. Med. Jour.*, 1888, vol. i., p. 73.

few days and should be followed up by a course of salicylate of soda.

Brunton recommends nitro-hydrochloric acid when the pain is situated above the eyeballs and there is no constipation; also in pain at the back of the neck.

Opium.—Robert Whytt gave large doses of this drug in headache,¹ and many of the older physicians had, as might be expected, recourse to it in the severer forms of head-pain. It is in tumours of the brain that it is most urgently called for, and unfortunately it is sometimes the only drug that will then afford relief. It is also often useful in senile headaches. It is best given as an injection. As opium is one of the agents which increase the acidity of the urine and free the blood of uric acid,² it may be given at the beginning of an attack of megrim, to be followed by large doses of salicylate of soda, and it is often a good plan to combine calomel with it. R. Jack recommends the injection of morphia in megrim,³ but that it should be used very cautiously is shown by Keating's statement, that "hundreds of people are rendered morphomaniacs by the thoughtless administration of morphine for headaches;"⁴ his remark, however, can scarcely be said to apply in our own country.

Antipyrine.—Amongst those who have successfully applied antipyrine in headache are Hammond, Warren, Ogilvie, Wilks, Dana, Sequin, Peake, Eustace Smith, and Haig. The latter has shown that it raises the acidity of the urine, and, like other drugs having this effect, diminishes uric acid excretion, and he concludes that it benefits in headache by driving the uric acid out of the blood into the tissues. But while its good effect may be in part due to this, especially in megrim, it probably acts in other ways also: witness its effect upon the lightning pains of locomotor ataxy. It undoubtedly relieves the neuralgic forms of headache, as every one who has used it can testify. It does not, however, remove the cause of the headache, acting rather as a temporary anodyne.

Hammond has used antipyrine in megrim, and has found it

¹ "Observations," etc., Edin. 1765, p. 516.

² "Uric Acid," p. 104.

³ *Lancet*, 1884, vol. ii., p. 351.

⁴ Keating's "Cyclop. Diseases of Children," London, 1890, vol. iv., p. 839.

acts best in the vaso-paralytic variety. He also finds it very effective in the headache of the "diner out." (But surely the best way to treat his headache is not to "dine out"!) The headache here, as in so many other cases of pain, is a signal of danger, and it is far better to heed the warning than to stifle it with drugs. Antipyrine should be given in ten-grain doses at intervals of half an hour, but should not be continued beyond the third dose. Small doses, as Peake observes, often act better than large quantities, and, according to Dana, the best results are sometimes obtained by small doses frequently repeated. If there is evidence of feeble cardiac action we may combine digitalis with the drug.

Salts of Caffein.—Caffein, the active principle of tea, coffee, and cocoa, or guarana, is a very valuable remedy in headache. Coffee was introduced into Europe about 1650, and tea in the early part of the sixteenth century. The value of the former in headache seems to have been quickly recognised. Thus, I find Willis recommending the following prescription for it: *Tinctura pulveris baccarum coffee impregnatum, bis in die, ad ʒvj vel ʒviij calide sumendum.*¹ Baglivus in 1725 extols coffee as an efficacious remedy in the headache, heaviness, and mental depression which may come on after a meal. He tells how when his digestion had been weakened by overwork in his profession, he would be attacked about three hours after food (post-prandium) by these symptoms, and how, if he then took two or three cups of coffee (caphé), he would "suddenly and miraculously" be freed from them. He was of opinion that coffee was most useful when the trouble arose from the stomach, and tea in primary affection of the head. He was also familiar with the injurious effects of excessive coffee-drinking, mentioning wakefulness and tremors among others.²

Quite early in this century coffee and opium were employed in headache;³ a combination especially useful in the uric-acid headache, since each of these drugs tends to free the blood of uric acid. Not long after Hannon advocated citrate

¹ "De Anima Brutorum," Lond. 1672, pp. 197, 198.

² G. Baglivi, "Opera Omnia," Antwerp, 1715, p. 76.

³ Labarraque, *op. cit.*, p. 61.

of caffen in hemicrania, and at the same time two long articles on this substance appeared in the *Presse Méd. de Brux.*¹ A few years later we find Kent Spender writing—"After all there is nothing like three or four cups of strong tea" in headache.² Boileau in 1855 recorded a case of obstinate headache which was successfully treated by hydrochlorate of morphia dissolved in a strong effusion of coffee, though neither remedy separately availed, and since then caffen in its various forms has been recommended by many in headache; among them may be mentioned Snell, Beard, Hamilton, Wilks, Sequin, Ashby, and Wright.

Haig has shown that caffeine acts like an acid, freeing the blood of uric acid by driving it into the tissues; and to this action he attributes its beneficial action in headache. Its good effects are particularly well shown during the alkaline tide of the early morning, when the blood is wont to be surcharged with the uric acid held back during the acid tide of the night. A cup of tea or coffee is then most effective in removing headache and irritability. With our Continental neighbours, it is the custom not to breakfast till eleven o'clock, but coffee is generally taken first thing in the morning, and doubtless prevents the symptoms of uric-acidæmia which would otherwise be very apt to show themselves.

But while the symptoms of morning uric-acidæmia may be relieved by taking caffen (in whatever shape), acids, or other drugs capable of freeing the blood of uric acid, it is far wiser to strike at the root of the trouble—*i.e.*, diminish uric-acid accumulation. This we may do by adopting the plan recommended by Sir William Roberts in the treatment of uric-acid calculi and gravel—*viz.*, by giving citrate or bicarbonate of potash the last thing at night, the effect of which is to increase the nightly excretion of uric acid, and thus diminish the morning uric-acidæmia. The same result may be obtained by giving salicylate of soda instead. Above all, the patient should avoid taking acid drinks at this time.

¹ *Lancet*, Oct. 19, 1850, p. 451.

² *Assoc. Med. Jour.*, Lond. 1854, pp. 307-308; and again in 1884, he advises those who wake in the morning with megrim to take strong tea at intervals, observing that strong coffee is sometimes better still. *Brit. Med. Jour.*, 1884, vol. i., p. 1144.

Tea and coffee are also useful in the headache of bodily fatigue, in that, for instance, from which women are so apt to suffer after a long day's shopping. This headache is generally removed by a short rest and a cup of tea. And here it is well to observe that the good effects of the tea and coffee must not be wholly set down to the caffein which they contain. A condition of success—generally at least—is that they should be taken hot, and their beneficial action is further enhanced by slowly sipping them, for, as Brunton has insisted, the mere act of sipping acts as a stimulant whatever be the fluid sipped. This I have repeatedly observed, and I have little doubt that many people who habitually resort to alcohol when they feel tired, would be quite surprised to find what good effects a glass of water has. The man who habitually takes his glass of sherry on an empty stomach, as a pick-me-up when he returns home fatigued in the evening, would derive far more real advantage from half a tumblerful of water. In regard to the temperature of the drink taken, it should, in my belief, be either decidedly cold or decidedly hot. Most people will prefer to take the water cold, and the tea or coffee hot. The heat or cold (as the case may be) itself acts as a stimulant to the oral and gastric mucous membrane, and doubtless in this way exercises a very definite influence on the vascular system.

A question of some importance arises here. If caffein drives uric acid into the tissues and thus prevents its elimination from the body, must not excessive tea-drinking be especially injurious in those liable to the diseases produced by uric acid, such as gout, megrim, rheumatism(?), and rheumatoid arthritis(?)? I have frequently known megrim to occur in women who take little or no alcohol, and who subsist chiefly on a vegetable diet, and the question naturally suggests itself, whether the tea of which they freely partake may not be to some extent responsible for the megrim.

Caffein may be given pure in the form of a pill (1-5 grs.), or as the citrate (1-5 grs.), in pill, powder, or mixture. Though almost insoluble in water, it readily dissolves in a solution of salicylate of soda, with which it is often advantageously combined. An effervescing citrate has been prepared; also a valerianate of

caffein. This latter has been recommended by Rosenthal in megrim.

Guarana.—Wilks has been chiefly instrumental in bringing guarana into use in this country as a remedy in megrim. It was recommended to him by Helmcken of British Columbia, and afterwards by Wood of Montreal,¹ and he contributed an article on the subject to the *British Medical Journal* in 1872. In the next issue of this journal P. W. Latham pointed out that guarana had been for some time a favourite remedy in France for megrim and neuralgia, and had already come into use in Germany; but I find that, twenty years before this, Richie, a surgeon in the Royal Navy, had written an article on the properties and uses of guarana,² in which he states that it had been carefully analysed and employed medicinally by Theodore Martins, as early as 1826. The latter was apparently familiar with its use in hemicrania. Richie gave one drachm of the powder with sugar and water three times a day.

During the last twenty years many writers have attested to the value of guarana in megrim, but like other drugs it is apt to lose its efficacy after being taken for a time, and in some cases it does no good whatever. It should be given in the form of the powder and in doses of from one to two drachms mixed with hot water, to which sugar may be added, or as the fluid extract in doses varying from half a drachm to an ounce. It is chiefly useful at the beginning of the attack.

Ergot.—This drug has, on account of its action on the blood-vessels, been much used in nervous disorders, especially in those which have been thought to depend upon some error in the vaso-motor system. Silver maintains that it is the best remedy in the Pharmacopœia for headache. He gives four or five doses of from ten to twenty drops each, at intervals of half an hour, unless the pain stops at the second or third, and he sometimes combines opium with the ergot. Eulenberg, Berger, Eustace Smith, A. A. Smith, and others speak highly of the action of ergot in megrim. The last-named recommends large doses, beginning with one drachm three times a day, and increasing to half an ounce. Eustace Smith uses a mixture of

¹ See *Brit. Med. Jour.*, April 20, 1872, p. 421.

² *Month. Jour. of Med. Sciences*, May, 1852, p. 465.

ergot, liquor strychniæ, and spirits of chloroform to ward off megrim in children.

I have employed ergot largely in all sorts of functional nervous disturbances, headache included, but with such varying results that I have come to regard it as one of those drugs on which we may fall back when other remedies have failed, rather than as one to be resorted to in the first instance. Every now and then we come across a case in which it is of the greatest benefit; one of my patients used to come regularly to the hospital for a mixture containing ergot as its chief ingredient, and she declared that she could not bear her headache unless she had it.

Turpentine.—Warburton Begbie has a long and interesting article on the therapeutics of turpentine,¹ in which he refers to “its wonderful soothing action over the nervous centres,” and to the good effect produced by the oil in the “headache of a fatigued brain.” Twenty drops of turpentine, “given at intervals of an hour or two, will not only remove the headache, but produce, in a wonderful manner, that soothing influence to which reference has already been made.” Graves gave the oil in large doses in the headache of “plethoric young women,” as also Teissier of Lyons in the headache of “nervous women.”³

I have myself obtained excellent results from turpentine. Its drawbacks are its unpleasant taste and its tendency to repeat, while its benefits are many. It removes flatulence, it has a remarkable influence on the blood, correcting a scorbutic tendency more rapidly than any other drug, and finally—whether by direct or indirect means, I shall not attempt to decide—it raises the spirits and soothes the nervous system in the manner described by Begbie. It is especially valuable in headaches occurring in those with spongy gums, those who suffer from flatulence, and in the plethoric. In some forms of headache I have known turpentine do more good than any other remedy. In the case of one patient every other drug tried, including antipyrine, failed to give relief, but turpentine

¹ “Selections from the Works of the late J. Warburton Begbie,” edited by Dyce Duckworth, 1882, p. 281.

² *Dub. Jour. of Med. Science*, 1833, p. 135.

³ *Brit. and For. Med., Chir. Review*, July, 1864, p. 245.

did great good; "directly he left it off the headache came on." I usually give from ten to twenty drops with mucilage, flavoured with oil of cinnamon. Graves and Begbie gave it with cold water; Holme, with honey. It may also be given in the form recommended by Murchison in adynamic fevers, namely, with half a drachm each of sulphuric ether and compound spirits of juniper, in an ounce of *mistura amygdalæ*. Finally, it may be given in capsules.

Valerian and the Valerianates.—Valerian is an old and trusted remedy. Whytt strongly recommended an extract of this drug in "nervous headache,"¹ while Latham prescribed the ammoniated tincture and the aromatic spirits of ammonia in half-drachm to one-drachm doses, and certainly both are valuable remedies in mental depression, whether occurring in connection with megrim or otherwise. Handfield Jones speaks highly of the valerianate of quinine and the valerianate of iron and quinine in headache. Valerianate of caffein has been given successfully in megrim.

Of the various compounds of valerian I have had most experience of the zinc salt. Symonds speaks in high terms of this as a remedy in headache. He recommends that it should be given in large doses, citing the case of a lady who was cured of a headache by taking at one dose six grains of the salt, instead of one grain, as had been ordered. According to Lauder Brunton the activity of valerian is due, not to the valerianic acid which it contains, but to the volatile oil, and he contends that it is better, instead of giving valerianate of zinc, to use valerian itself or its oil along with a salt of zinc, as the acid has no important physiological action."² Be this as it may, I have seen considerable good result from valerianate of zinc in a large number of cases. Its effect in lessening the tendency to megrim is often decided, though, as with other drugs, its efficacy is apt to disappear after long use. It may be prescribed in pill form (from one to five grains) and with hyoscyamus, and should be continued for a considerable period.

Quinine.—"Quinine appears to me," wrote Symonds, "to be of all remedies that which is most extensively and

¹ See Stuckens also, "*De Dolore Capitis*," Brux. 1787.

² "A Text-book of Pharmacology," etc., Lond. 1887, p. 952.

constantly serviceable in headache. . . . It would be less frequently productive of disappointment, were it given more liberally and more unflinchingly." When there is a history of malarial poisoning, quinine is invaluable in headache, and it often does good in head-pains of an intermittent character, even though there is no clear trace of poisoning. In these latter cases five grains of the sulphate, with from fifteen to twenty drops of hydrobromic acid, should be given before the expected seizure. In cases of unmistakable malarial origin, the dose should be increased to ten, twenty, or even thirty grains. In all it is a good plan to give first a saline purge, and the patient should be warned of the possibility of unpleasant symptoms. Large doses of quinine are often most successful in curing a dental neuralgia, especially when the patient is much run down. Jones recommended from five to eight grains of the sulphate; Birt as much as thirty grains. The dose should certainly not be less than five grains. It may conveniently be given in the form of a pill in conjunction with extract of hemlock, and compound galbanum pill.

Arsenic.—This drug, like quinine, has been largely used in brow-ague and other head-pains of malarial origin. According to Sir Thomas Watson nine out of ten cases of hemicrania will yield to it! (As the older writers included brow-ague under hemicrania, it is just possible that most of Watson's cases of hemicrania were malarial.) F. W. Mackenzie recommended arsenic "in intermittent headaches, brow-ague, cephalalgia, and other affections in which the mucous membrane of the frontal sinus appears to be the seat of the pain,"¹ and it is undoubtedly valuable in all these. To obtain its full effect it should be given over a long period of time and in ever-increasing doses. If we begin with five drops of the liquor arsenicalis three times a day after meals, and increase the dose by two-and-a-half drops every week, we can as a rule get the patient to tolerate from twenty-five to thirty-drop doses, and in such case we obtain the "alterative" effect of the drug in the truest sense of the term, the tissues being profoundly altered. Thus administered arsenic is one of the most valuable remedies we possess.

¹ *Lond. Jour. of Med.*, July, 1851 p. 637.

Salts of Iron.—When anæmia is present, especially that variety known as chlorosis, iron in some form is, of course, indispensable. This drug in some induces headache. Sometimes the perchloride will quickly remove a headache, but here the rapid effect is probably due to the acid it contains. Willis refers to the use of chalybeates in headache. “A long and grievous headache,” he writes, “is wont to be cured, not so much by remedies applyed or proper, for the head, as by those which restore the crasis, or constitution of the nervous juice, and the bloody mass; and such are chalybeats, or steel medicines and antiscorbutics, or medicines against the scurvy.”¹ We have still much to learn concerning the pathology of anæmia, and the best methods of coping with it. Thus, some cases of chlorosis respond readily to iron, while others obstinately resist its action, showing that the two classes cannot be exactly the same. Again, there is a form of anæmia met with in young adults, notably of the female sex, which is not pernicious anæmia, nor due, so far as we can discover, to organic disease, and which iron does not touch. Often in such cases there is a history of rheumatism, and it is noteworthy that in obstinate anæmia a preliminary course of salicylate of soda will sometimes render the patient more responsive to iron.

Phosphorus.—Some have extolled this drug in certain varieties of headache. It has been given chiefly in the form of the dilute acid. In the headache of uric-acidæmia practically any acid will benefit for the time being (probably, as Haig suggests, by lowering the alkalinity of the blood and thus driving the uric acid into the tissues), and it seems probable that the good effects of phosphoric acid are due to the acid rather than to any effect of the base.

Cannabis Indica.—In 1873 we find R. Green recommending this drug for megrim. He gave one-third of a grain of the *freshly-prepared* alcoholic extract in pill, night and morning, raising the dose, in severe cases, to one-half or two-thirds of a grain; and he insisted that the treatment should be continued a long time—several weeks at the least. Sequin maintains that cannabis indica is nearly as efficacious in megrim as bromide in epilepsy, and Green, that it is even more so.

¹ *Op. cit.*, p. 109.

Among other writers who attest its value in megrim are Wilks and Kent Spender.

Ringer and Stephen Mackenzie have successfully employed it in chronic non-megrinous headache. The latter usually gives half a grain of the extract night and morning, or three times a day. If no good has resulted at the end of a week, he increases the dose to one grain, and if this also is ineffectual, he still further raises it, until the dose of the night reaches two grains, and that of the morning, one-and-a-half grains.

Croton chloral-hydrate (or, more accurately, butyl-chloral-hydras).—This drug has an undoubted action on neuralgia, notably of the fifth nerve, and it is therefore useful in neuralgic headache. Markham Skerritt has recorded eighteen cases of headache that were relieved by it.¹ He has found it specially useful in the headache of anæmic girls. Riddell has successfully employed it in the headaches occurring at the climacteric, and in women suffering from considerable mental perturbation. It should be given in five-grain doses, three or four times daily. It is readily soluble in glycerine and rectified spirit. If given with the latter, it may be ordered with a drachm of orange-flower water to the dose; or it may be given suspended in *mistura amygdalæ*, with a drachm of syrup of tolu to the dose; finally, it may be made up in a pill containing two grains of butyl-chloral and quinine respectively, with glycerine in the necessary proportion.

Chloral-hydras.—This substance has been given in megrim with success.

Chloroform.—Trousseau recommended the inhalation of small quantities of chloroform in certain headaches. From ten to twenty drops may be poured into the partly closed hand, and a deep inspiration taken from it; or, instead of the hand, a piece of lint, placed in a wineglass, may be used.

Simple and Saline Ethers.—Like other diffusible stimulants, these substances are often serviceable in headache. A half-drachm to one-and-a-half-drachm dose of the simple or compound spirits of ether may be given, or we may have recourse to the spirit of nitrous ether (a half to two fluid drachms). Clertan administered ether in the form of capsules for neuralgia,

hemicrania, and gastralgia, with the object of introducing the pure ether into the stomach.¹

Nitrite of Amyl.—This substance lowers blood-pressure, and hence, theoretically, should be useful in headaches associated with high arterial tension, or with spasm of the cephalic arteries such as may occur in megrim. "As migraine is generally connected with vascular spasm," writes Lauder Brunton, "I employed the nitrite of amyl in headache, and found that frequently, though not invariably, it relieved the pain."² Balthazar Foster found it relieve frontal headache associated with high arterial tension "like magic." R. Pick, Douglas Lithgow, Riddle, Rosenthal, Lloyd Jones, and others have also obtained good results from this drug in headache. I have myself been somewhat disappointed with its action.

Nitro-glycerine.—As early as 1858 nitro-glycerine was successfully given in neuralgia and hemicrania by A. G. Field.³ Like nitrite of amyl it dilates the arterioles and thus produces a rapid fall in arterial tension. We should therefore expect it to do good in the class of cases benefited by nitrite of amyl, and inasmuch as its action is more persistent than that of the latter drug, it deserves the first trial. Lloyd Jones claims to have had good results from its use in "high-tension" headaches, and has given it with great benefit in the headache of anæmic girls. Berger, Trusevich, and Mayo Robson advocate its use in megrim, in the vaso-spastic variety of which it is said to be specially useful. From one to two drops of the 1-p.c. alcoholic solution may be placed on the tongue at intervals of a few minutes, or the tablets may be employed.

Aconite.—W. C. Radley, writing in 1837, speaks enthusiastically of the beneficial effects of aconite in headache, and cites several cases in illustration.⁴ T. H. Burgess treated "headache from exhaustion" with aconite,⁵ and H. G. Wright loudly extols its action in neuralgic headaches. According to

¹ *Jour. de Méd. et de Chir. Pract.*, April, 1853.

² "Pharmacology," etc., p. 787.

³ *Med. Times and Gaz.*, 1858, vol. i., p. 384.

⁴ *Lancet*, 1837, vol. ii., p. 925. The notes of these cases were taken twenty years previously.

⁵ *Edin. Med. Jour.*, 1840, p. 101.

Gruber it is a specific in trigeminal neuralgia, but not in other kinds.

Aconite is useful in quieting the circulation, and may therefore be used with benefit in the headache accompanying certain febrile states—as in tonsillitis, pneumonia, erysipelas. Fothergill testified to its beneficent action in “congestive headache with cold hands and feet,” by which he presumably referred to headache accompanied by pulsation of the carotids and a general chilliness of the body and limbs. Cleborne recommends the drug when there is much nervous excitement, with quick pulse, and Symonds in “hyperæmic” headache, a term which, though scarcely justifiable, is yet sufficiently clear—in the present instance, at all events. Thus, a drop of the tincture given every half-hour in febrile headache with full and bounding pulse often does good.

Strychnine.—Some authorities (*c.g.*, Kent Spender and Handfield Jones) regard strychnine as one of the best remedies in headache. According to Cleborne, it is especially useful in the headache of the studious and sedentary, and particularly in the variety known as *clavus*. Eustace Smith employs it in conjunction with the liquid extract of ergot and spirits of chloroform to ward off megrim, and since Haig has shown that it acts like an acid in freeing the blood of uric acid, we can understand its good effect here. He thinks it also does good in headache by improving digestion, and promoting absorption, often then at a standstill.¹ I have frequently, and with the best result, given strychnine with iron, as well as with nitrohydrochloric acid in headache, when there has been no anæmia, though I have not been able to determine the precise way in which they did good. Seeing that they all free the blood of uric acid, it is probable that their beneficial effect in certain headaches may be explained in this way. Some prefer *nux vomica* to strychnine.

Salts of Zinc.—These salts have a well-deserved reputation as nervine tonics. I can only speak from personal experience of the oxide (from two to ten grains) and the valerianate (from a quarter of a grain to four grains), both of which have yielded good results in chronic headache and megrim. They

¹ “Uric Acid,” p.

are, however, very apt to lose their effect after a time. They are best given in pill form and after meals. Bierbaum has successfully employed the acetate in headache (from one to two grains).

Salts of Silver.—Graves recommended the nitrate (one-sixth to half a grain) for the “headache of nervous young women.” I have myself had no experience of the effects of the silver salts in headache.

Belladonna.—Atropine, instilled into the eyes, will sometimes cut short a headache due to error of refraction. Belladonna is undoubtedly useful in some cases of headache, its good effects being, perhaps, most marked when the cephalic circulation is unwontedly active. Brunton recommends three drops of the tincture every three hours in frontal headache.

Gelsemium.—This drug is chiefly useful in neuralgic headache, and may be given in conjunction with large doses of chloride of ammonium frequently repeated. Its action should be carefully watched, as it tends to depress the heart. Ten drops of the tincture constitute a medium dose.

Digitalis.—When prescribing a drug which, like the last named, exercises a depressing influence on the heart, it may be advisable to add a few drops of tincture of digitalis, especially when there is a tendency to cardiac failure or to functional irregularity. Apart altogether from its action on the heart and blood-vessels, this drug has a distinct sedative influence on the nervous system. Muscroft claims to have controlled a severe headache by large doses of the tincture.¹

Camphor.—Before the bromides came into use, camphor was much more frequently employed than now for its quieting effects on an irritable nervous system. The mixture affords a convenient vehicle for other nervines. In the headache and other nervous symptoms resulting from tobacco-poisoning it is an invaluable remedy. Monobromo-camphor has been reported useful in headache by more than one observer—especially in that form which results from inebriety.

Cimifuga.—In the form of tincture (ten drops) this drug has proved of occasional use in headache.

Eucalyptus.—Several writers testify to the value of eucalyptus

¹ *Cincin. Lancet and Obs.*, 1872, vol. xv., p. 75.

oil in headache.¹ Lewis gives five drops every four hours. It is most useful in rheumatic and malarial headache.

Sulphur.—Copland recommends precipitated sulphur in rheumatic headache, and there can be little doubt that this often proves a useful drug in functional disorders of the nervous system, the good result being probably due to its beneficial effect on the alimentary tract.

Purges.—Purgation has from time immemorial occupied a foremost place in the treatment of headache. Thus, we find it recommended by Galen and his contemporaries; later, by Haly Abbas and Rhases, who insisted especially upon the necessity of purging in headache due to injury to the head; again, by Willis, who says of headaches occurring in plethoric people, that “the belly should be cooled and kept soluble by the use of clysters;”² and so on down to the present day, when blue pill followed by black draught constitutes a common and often, indeed, a very efficacious method of combating headache.

Every case should, of course, be treated on its own merits, and it is not necessary here to lay down precise rules as to purgation in headache. The following are the chief classes of cases in which it is called for. Whenever there is constipation, we naturally seek to remove it, though active purgation may not be necessary. Whenever we have reason to believe that the alimentary tract is in an unhealthy state, and that the patient is suffering from ptomainic poisoning, as, for instance, when there is acute follicular tonsillitis, with loaded tongue and intensely foul breath, the first thing to be done is to clear the pent-up poisons out of the body; and, for this purpose, calomel and colocynth probably answer our purpose as well as any other drugs.³ Again, when the biliary secretion is sluggish, we may require to hurry on the action of the liver, and to this end we may have to call purges to our aid. When the patient is markedly plethoric, as, for instance, in full-blooded women at the climacteric when menstruation has been absent for some time, treatment by salines may be of

¹ See article by Lewis in *Med. News*, July 20, 1889.

² Among the purgatives Willis employed for headache were cream of tartar, scammony, and jalap.

³ In the case just considered we should follow up this treatment by giving abundant nourishment and tonics.

signal service. Headache coming on after a meal, also, may sometimes be relieved by a purge, the pain, as Pelham Warren observes, disappearing, it may be, before the medicine has "operated." Lastly, if the patient has a persistent high-tension pulse, it may be advisable to put him through a course of calomel and salines after the plan recommended by Sir William Broadbent.

But while treatment by aperient medicines is often useful in headache, we must beware lest we carry it too far. It is only in exceptional cases, as of persistent high arterial tension and some of excessive plethora, that chronic purgation is justifiable, since the more opening medicines are resorted to, the more does the patient become dependent upon them, the law being, that the more an organ is artificially helped, the more incapable does it become of carrying on its functions without the artificial stimulus. Let us suppose an individual accustomed to high living and a sedentary life is suffering from sluggish liver and constipation. He takes a blue pill at night, and Epsom salts the next morning, and for the time feels himself a new man. But are the results lasting, are we striking at the root of the mischief? In my experience there is a great tendency to reaction in these cases; by artificially aiding the liver, we make it the more liable to strike work a second time. Again the patient feels poorly, again he flies to the blue pill, with the same temporary good effect; and so on, the liver ever becoming less and less efficient. And thus the individual drifts into the bad habit of depending on drugs, yet all unconscious that he is doing himself lasting harm. What impresses him *is the benefit he immediately derives from the medicine*; the reaction which follows he does not attribute to it. It is like treating a patient with uric-acidæmia by acids alone; we obtain a brilliant result for the time, but at the expense of future misery. If, in the above case, instead of resorting to blue pill, we modify the diet both as to quality and quantity, and compel the patient to take adequate exercise, we shall in most cases get the liver to do its work more efficiently than by the employment of any number of drugs.

But while I think it very necessary to guard against the habit of reverting too frequently to purgative medicines, and

to rely as far as possible on more natural means in our endeavour to excite the activities of the alimentary tract and other digestive viscera, I must not be understood to imply that such drugs as salines, calomel, and blue pill may not be of the greatest service in the treatment of headache, if skilfully employed. The beneficial effect of the two latter in mental perturbation, headache, and other morbid cephalic sensations, is often truly remarkable, especially when arterial tension is high, and indeed, in those with persistent high tension they are well-nigh indispensable. I may remark, by the way, that I have frequently advised students to take a four-grain blue pill about an hour before going in for examination, with the most happy effect—mental perturbation and obfuscation disappearing like magic.

Emetics.—Emesis has been resorted to for the cure of headache from the time of the ancients.¹ This treatment is called for when we are satisfied that the headache is due to the presence of undigested food in the stomach. Sulphate of zinc, mustard, and ipecacuanha are the best emetics to employ. In children from one to two teaspoonfuls of ipecacuanha wine, answer best. After the emesis, we may often with advantage give a saline purge. Alex. Wallace has cut short an attack of megrim by a hypodermic injection of apo-morphia, but he considers that the depression thus induced is as bad as the disease.² It is certain that the vomiting which comes on spontaneously with the attack may relieve the pain, and when the patient knows this by experience effort should be made to induce it. On the other hand, some patients are in no way benefited by the vomiting, and in such it is manifestly useless to give emetics.

NOTE.—It has been seen that the sodium and potassium salts increase the elimination of uric acid. Haig supposes they do this by augmenting the alkalinity of the blood. The investigations of Sir William Roberts regarding the solubility of the urates, as set forth in the Croonian Lectures (1892), admirable alike in matter and lucidity, show, however, that the solvent power of the blood on uric acid is not enhanced by increasing its alkalinity.

¹ It is, for instance, expressly recommended by Aurelianus, Rhases, and Van Swieten. Rhases produced emesis in "headache due to bile" by giving tepid water, subsequently purging the patient.

² *Lancet*, 1893, vol. i., p. 79.

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